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UDC 581.132

ELECTROPHORETOGRAMS OF PROTEIN-PIGMENT COMPLEXES OF CHLOROPLASTS OF WINTER WHEAT DURING OVERWINTERING

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 87 pp 17-21

[Article by R.A. Alybayeva, D.I. Tungatarova and F.A. Polimbetova, Institute of Botany, Kazakh SSR Academy of Sciences]

[Abstract] Polyacrylamide gel electrophoretic studies were conducted to assess the state of chloroplast membranes of winter wheat in relation to temperature shifts. The protein-pigment complexes were evaluated for the frost-resistant Albidum 114 variety and the frost-susceptible Kazakhstanskaya 126 variety. Analysis of the electrophoretogram patterns for both varieties at different temperatures demonstrated that the chloroplast membrane system of Albidum 114 possessed greater stability. Adaptation to cold temperatures was shown to increase such stability, but temperature shifts from positive to negative temperatures, or vice versa, had an adverse effect on the stability parameter. Figures 3; references 5: 1 Russian, 4 Western.

12172/9716
CSO: 1840/860

UDC 581.198:577.42:575.113

SYNTHESIS OF 'STRESS PROTEINS' IN CELLS OF SUSPENSION CULTURE OF SOY AT LOW TEMPERATURE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 1, Jul 87 (manuscript received 31 Dec 86) pp 253-256

[Article by V.K. Voynikov, M.V. Korytov, Ye. A. Kalacheva, R.T. Polikarpochkina and R. S. Salyayev, corresponding member, USSR Academy of Sciences, Siberian Institute of Physiology and Biochemistry of Plants, Siberian Department, USSR Academy of Sciences, Irkutsk]

[Abstract] "Stress proteins" appear in plants with increased temperature, a result of changes in the expression of the corresponding genes. The production of stress proteins in plant cells at low temperature has not been studied.

This article studies the possibility of low-temperature induction of the synthesis of stress proteins in suspension cultures of soy plant cells. The spectrum of thermal shock or stress proteins found in the area of molecular masses 63-73 kDa coincides with the spectrum of stress proteins of intact soy sprouts. However, low-molecular-weight stress proteins were not discovered. Low temperature (10, 14°C) thus yields a significant change in protein synthesis, including a sharp increase in the formation of "stress proteins" in the cells of a suspension culture of soy. Figure 1; references 8: 3 Russian, 5 Western.

6508/9716
CSO: 18400918

UDC 547.854+547.857

SYNTHESIS OF MIXED TYPE NUCLEOPEPTIDES BY SILYL METHOD

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 4, Apr 87 (manuscript received 3 Jun 86) pp 961-962

[Article by Yu. M. Taskayeva and Yu. P. Shvachkin, Moscow State University imeni M.V. Lomonosov]

[Abstract] In connection with the study of nucleoamino acid analogs of neuropeptides, the authors investigated the possibility of synthesizing mixed-type nucleopeptides by the silyl method. The study established that when N, O-bis trimethylsilylacetamide is used as the silylating agent, the reaction of synthesis occurs rapidly, easily and with high yield, producing mixed-type nucleopeptides containing nucleoamino acid and proteinamino acid groups. The method of synthesis, by its simplicity and effectiveness, provides for rapid production of mixed-type nucleopeptides in preparative scale. References 2 (Russian).

6508/9716
CSO: 1840/899

UDC 547.854+547.857+547.466

SYNTHESIS OF MIXED TYPE NUCLEOPEPTIDES RELATED TO ENKEPHALINS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 4, Apr 87 (manuscript received 3 Jun 86) pp 963-964

[Article by O.N. Ryabtseva, M.G. Petrova, G.A. Korshunova and Yu.P. Shvachkin, Moscow State University imeni M.V. Lomonosov]

[Abstract] As a part of the study of the enzyme-stable analogs of the neuropeptides, the authors synthesized previously-unknown, mixed-type nucleopeptides related to enkephalins. The synthesis was performed by fragment condensation in a three-plus-two scheme. The reactions forming the peptide bonds were performed in solutions using the method of pentafluorophenylethers or the carbodiamide method with the addition of one-hydroxybenzotriazol. A tert-butyloxycarbinol group was used as the N-protective group and to protect the tyrosine hydroxyl. The carboxyl groups in the C-terminal amino acids groups

were protected by esterification or salt formation. The structure of the new compounds produced was determined by their synthesis, their individuality demonstrated by analytic, chromatographic and spectral data. References 3: 1 Russian, 2 Western.

6508/9716
CSO: 1840/899

UDC 547.964.4+541.69

SYNTHESIS OF des-Met^5,D-Ala^2-ENKEPHALIN HYDRAZIDE ANALOGS AND STUDY OF THEIR BIOLOGICAL ACTIVITY

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 5, May 87 (manuscript received 8 Apr 86) pp 1192-1198

[Article by G.P. Vlasov, Ye.N. Krasnikova, N. Yu. Kozhevnikova, V.N. Pavlov, A.N. Petrov, M.K. Shevchuk and Ye.K. Georgianova, Institute of High Molecular Weight Compounds, USSR Academy of Sciences, Leningrad; Institute of Toxicology, USSR Ministry of Health, Leningrad]

[Abstract] The purpose of this work was to study the influence of modification of positions, one and four, on the biological activity of a series of enkephalins. The model compound selected was not Met-enkephalin, but rather tetrapeptide-hydrazide H-Tyr-D-Ala-Gly-Phe-N_2H_3, which has more manifest analgesic properties and affinity for opiate receptors than derivatives of the endogenous compound. The possibility was studied of removing the synthesized analogs from the polymer carrier by saponification, ammonolysis and hydrazinolysis. The introduction of an additional hydroxyl group to the tyrosine phenol ring was found to decrease the biological activity both in vivo and in vitro. Introduction of a nitro group to the phenylalanine aromatic ring increased the activity of the analogs containing dihydroxyphenylalanine in position one. Successive replacement of phenylalanine by phenylhydrazine and its mono- and dinitro-derivatives resulted in the production of inactive analogs. References 12: 7 Russian, 5 Western.

6508/9716
CSO: 1840/899

UDC 547.854+547.857+547.466

SYNTHESIS OF NUCLEOAMINO ACID ANALOGS OF KYOTORPHINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 5, May 87 (manuscript received 3 Jun 86) p 1200

[Article by O.N. Ryabtseva, G.A. Korshunova and Yu.P. Shvachkin, Moscow State University imeni M.V. Lomonosov]

[Abstract] Continuing their study of the nucleoamino acid analogs of neuropeptides, the authors synthesized previously unknown mixed-type

nucleopeptides related to kyotorphine in which the L-nucleoamino acid group is N-terminal, while the C-terminal groups are L- or D-arginine. The reaction of formation of the peptide bonds was performed in solutions by the synthesis scheme and confirmed analytically and by spectral determinations. Synthesis of the set of new nucleopeptides creates the conditions necessary for a study of the structural-functional organization of the nucleoamino acid analogs of kyotorphine and other natural neuropeptides.

6508/9716
CSO: 1840/899

UDC 576.8.097.3

MONOCLONAL ANTIBODIES AGAINST CELL ORGANELLE ANTIGENS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 2, May 87 (manuscript received 11 Aug 86) pp 468-470

[Article by M.G. Frid, A.Ye. Kabakov, O.I. Ornatskaya, Ye.A. Smirnova and M.A. Glukhova, Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Conventional procedures were followed for generating monoclonal antibodies against human cell organelles. The hybridomas were obtained by fusing mouse myeloma x63-Ag 8.653 cells with the splenocytes of mice immunized with human smooth muscle cells. Propagation was conducted in the peritoneal cavities of BALB/c mice, with the antibodies harvested from the ascitic fluid. This approach resulted in the isolation of a series of monoclonal immunoglobins specific for mitochondria, nuclei, Golgi apparatus and lysosomes. Such monoclonal antibodies may be used in the isolation and purification of cell organelles and in immunomorphological and immunochemical studies. Figures 1; references 6: 1 Russian, 5 Western.

12172/9716
CSO: 1840/867

UDC 577.1

PROTECTION OF CELLULAR DNA FROM MUTAGENS BY RECOMBINANT GAMMA-INTERFERON

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 2, May 87 (manuscript received 29 Oct 86) pp 484-487

[Article by G.D. Zasukhina, I.M. Vasilyeva, I.V. Kolonina and V.V. Chekova, Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] A comparative analysis was conducted on the efficiency of human leukocyte interferon and recombinant gamma-interferon in protecting cellular DNA from damage by chemical mutagens. Incubation studies with human lymphocytes exposed to N-methyl-N'-nitro-N-nitrosoguanidine showed that

both interferons protected DNA from degradation, with the gamma-interferon constituting the more effective agent. Repair studies using 4-nitro-quinoline-1-oxide led to the demonstration that the recombinant gamma-interferon stimulated the process of excision repair in human cells. Figures 1; tables 1; references 4: 3 Russian, 1 Western.

12172/9716
CSO: 1840/867

UDC 577.964.4:577.112.6

SYNTHESIS OF PEPTIDES OF PROTEIN VP1 OF HEPATITIS A VIRUS

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, Jan-Feb 87 (manuscript received 16 Jul 86) pp 152-153

[Article by Yu.A. Semiletov, M.G. Petrova and V.D. Smirnov, Institute of Virology imeni D.I. Ivanvovkiy, Moscow]

[Abstract] A wet method was used for the synthesis of two peptides, the sequences 99-109 and 115-125 of the VP1 protein of hepatitis A virus. The approach relied on chain growth mediated via pentafluorophenyl esters and block-condensation using the azide method. Confirmation of both peptides was obtained via TLC analysis on silica gel. References 6: 1 Russian, 5 Western.

12172/9716
CSO: 1840/862

UDC 577.113.4

CHANGES IN CONDITIONS OF SYNTHESIS OF OLIGODEOXYRIBONUCLEOTIDES ON AUTOMATED SYNTHESIZERS VIKTORIYA-2 AND VIKTORIYA-4M

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, Jan-Feb 87 (manuscript received 20 Oct 86) pp 153-155

[Article by T.S. Oretskaya, Ye.A. Kubareva, S.M. Gryaznov, A.I. Lomakin and V.K. Potapov, Moscow State University imeni M.V. Lomonosov]

[Abstract] Modifications were introduced into the Viktoriya-2 and Viktoriya-4M automated synthesizers of deoxyribonucleotides to render the process more efficient and less time consuming. The use of triisopropyl-benzolsulfochloride, gamma-dimethylaminopyridine N-oxide, and N-methylimidazole as condensing agents (1:3:7) in absolute pyridine made possible reduction of the total number of condensations to 14 from 20. Five nucleotides synthesized in this modification were then used for the construction of 29-30 monomer-long DNA duplexes that served as substrates for EcoRP restrictase. Figures 1; references 3: 2 Russian, 1 Western.

12172/9716
CSO: 1840/862

UDC 613.287:637.147.2+612.392.84:637.147.2](048.8)

MILK CASEIN AND ITS PHYSIOLOGICALLY ACTIVE PEPTIDES

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 87 (manuscript received 18 Dec 85) pp 3-9

[Article by Ye.Ya. Stan, Laboratory of Protein Metabolism, Institute of Nutrition, USSR Academy of Sciences, Moscow]

[Abstract] A literature review is presented on the accumulated knowledge about casein and its physiologically-active peptides. The information available to date has shown that in addition to the nutritional value of casein from various sources, the entire situation is much more complex than a simple nutritional problem. In many respects, casein and its derived peptides may be regarded as representing a unique class of 'nutritional' hormones. The effects of casein and its peptides goes far beyond nutritional value, affecting a number of physiologically-important factors in the alimentary system and on a systematic basis. For example, the 54-59 hexapeptide isolated from human casein (Val-Glu-Pro-Ile-Pro-Tyr) has been demonstrated to possess immunoregulatory properties, and to increase resistance of mice to pulmonary infections following intravenous administration. References 74: 17 Russian, 57 Western.

12172/9716
CSO: 1840/848

UDC 577.171.4:175.859

NEUTROPHIL ACTIVATION BY HUMAN LYSOZYME PEPTIDE FRAGMENT

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: BIOLOGIYA in Russian Issue 1, No 3, Feb 87 (manuscript received 20 Apr 85) pp 64-67

[Article by O.Yu. Yankovskiy, T.Ye. Dovnar, Z.N. Kingo, L.I. Leontyeva and Ye.I. Sorochinskaya]

[Abstract] The effects of the amino acid 11-14 tetrapeptide fragment (thr-leu-lys-arg) of human lysozyme were tested on human neutrophils, to obtain a better understanding of the immune effects of lysozyme and of its fragments that may putatively be formed by endogenous proteases. Nitrotetrazolium blue reduction studies showed that 3.0 µg/ml of the peptide increased the number of neutrophils with formazan granules to 217.%, from a control value of 12.2%. Furthermore, the peptide increased neutrophil death as measured by trypan blue exclusion in the presence of low BSA concentrations (0.1%) from 2.9% control value to 7.4%. The peptide in question was thus demonstrated to have a define effect on at least one component of the immune system. Such peptides may be formed in the course of lysozyme catabolism and in inflammatory foci with enhanced proteolytic activity, and may not be insignificant in specific and non-specific immune mechanisms. References 11: 2 Russian, 9 Western.

12172/9716
CSO: 1840/858

UDC 612.015.32:616.981.553

STRUCTURAL AND BIOLOGICAL CHARACTERISTICS OF BOTULINUM TOXINS

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 103, No 2, Mar-Apr 87 pp 229-242

[Article by N.P. Chesnokova, Saratov State Medical Institute, RSFSR Ministry of Health]

[Abstract] A review is presented of the structural and biological characteristics of botulinum toxins, commencing with the fact that all are produced as progenitor toxins. The progenitor toxins encompass three categories designated on the basis of sedimentation data as 12, 16 and 19S. The 12S molecule is universally isolated from all types (A, B, C, D, E, F, G), and consists of a neurotoxic and a hemagglutinating component. The progenitor toxins are converted to the active form by proteolytic enzymes, a process that involves splitting of the neurotoxic peptide chain into heavy and light peptide subunits joined by one or more disulfide bonds. Similarities and differences among the different types of botulinum toxins are noted with respect to amino acids and disulfide bonds, as well as in susceptiblity to digestion by trypsin, pepsin, and papain. To date, the pathogenetic potential of the hemagglutinating component remains unknown. In addition, fine details of the interaction of the toxins with receptors on the presynaptic terminals have not been studied as yet. References 80: 39 Russian, 41 Western.

12172/9716
CSO: 1840/861

UDC 547.854+547.857+547.466

SYNTHESIS AND PROPERTIES OF URACILYL ALANINE ANALOG OF THYROTROPIN-RELEASING HORMONE (TRH)

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 3, Mar 87 (manuscript received 17 Apr 86) pp 712-713

[Article by Yu.P. Shvachkin, Yu.A. Semiletov, K. Konde, V.P. Fedotov, I.S. Komolov, G.I. Bushuyeva, L.A. Batrameyeva and A.I. Ivanova, Institute of Experimental Endocrinology and Hormone Chemistry, USSR Academy of Medical Sciences, Moscow]

[Abstract] Pharmacologic testing was conducted with a TRH congener, in which Hist-2 was replaced by L-beta-(uracilyl-N^1)-alpha-alanine. The analog was synthesized by conventional methods involving stepwise peptide chain elongation from the C- to the N-terminus. Mice studies showed that the analog was similar to TRH in the reduction of the duration of hexenal-induced sleep, but differed in a number of other physiological parameters. Furthermore, the analog had no effect on basal thyrotropin secretion in cell cultures of rat adenohypophysis, and inhibited the effects of TRH. The latter observation indicated that the analog functions as a competitive inhibitor of TRH at the receptor level. References 6: 2 Russian, 4 Western.

12172/9716
CSO: 1840/879

UDC 591.145.3:591.111.4

EFFECTS OF ZOOTOXINS ON RHEOLOGIC PROPERTIES OF BLOOD AND ERYTHROCYTE SUSPENSIONS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 4, Apr 87 (manuscript received 27 Jan 86) pp 51-55

[Article by B.N. Orlov, N.V. Korneva and Ye.B. Romanova, Chair of Human and Animal Physiology and Biochemistry, Gorky State University imeni N.I. Lobachevskiy]

[Abstract] In order to obtain a better understanding of clinical problems and further define animal toxins as research tools, a study was conducted on the rheologic effects of various zootoxins on blood and erythrocyte suspensions of outbred albino mice. The data revealed variable effects, depending on the zootoxin and its concentration. Scorpion venom (Mesobuthus eupeus) and low concentrations of honeybee venom, its melittin component, and the venom of the poisonous snake Agkistrodon blomhoffii (10^{-7} to 10^{-11} M) reduced blood viscosity and the rate of erythrocyte sedimentation. High concentrations (10^{-4} to 10^{-5} M) of melittin, whole honeybee venom, (A. blomhoffii venom) increased blood viscosity and resistance of erythrocytes to deformation. These observations point to the need for further studies on the mechanism of action of the various toxins, particularly in view of the differences in the effects of high and low concentrations of some of the toxins. Figures 3; references 9: 7 Russian, 2 Western.

12172/9716
CSO: 1840/857

UDC 547.854+547.857+547.466

NUCLEOAMINO ACIDS AND NUCLEOPEPTIDES. PART 14. SYNTHESIS AND PROPERTIES OF NUCLEOAMINO ACID ANALOGS OF 1-5 HEPTAPEPTIDE DERMORPHIN

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 6, Jun 87 (manuscript received 12 Mar 86) pp 1393-1401

[Article by G.A. Korshunova, M.G. Petrova, Yu.M. Taskayeva, N.V. Sumbatyan and Yu.P. Shvachkin, Moscow State University imeni M.V. Lomonosov]

[Abstract] Details are presented on the chemical step involved in the synthesis of the 1-5 heptapeptide dermophin and its nucleoamino acid analogs for pharmacologic studies. The starting heptapeptide (H-L-Tyr-D-Ala-L-Phe-Gly-L-Tyr-L-Pro-L-Ser-NH_2) was modified by substitution of a nucleoamino acid at position 5 for the tyrosine residue. In vitro studies on binding to dermorphin receptors of the rat brain showed highest affinity exhibited by the 1-5 peptide, followed by the derivative in which tyrosine-5 was replaced by beta-(uracilyl-N^1)-alpha-alanine-NH_2. In vivo studies showed that in terms of analgesic action on mice another derivative with beta-(uracilyl-N^1)-alpha-alanine-OH at position 5 was more effective than the native 1-5 heptapeptide. References 13: 3 Russian, 10 Western.

12172/9716
CSO: 1841/929

UDC 577.21.6.1.3.1

CLONING AND PRIMARY STRUCTURE OF GENES OF SHIGELLA TOXIN

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 3, Jul 87 (manuscript received 30 Apr 87) pp 740-744

[Article by Yu.V. Kozlov, A.A. Kabishev, V.I. Fedchenko and A.A. Bayev, academician, Institute of Molecular Biology, USSR Academy of Sciences, Moscow]

[Abstract] The cloning and primary structure analysis of the Shigella dysenteriae toxin gene was based on an initial preparation of the gene bank of the Sh. dysenteriae chromosome using as vector cosmid pCH 79. The cytotoxic properties of the toxin for HeLa S3 cells facilitated selection of clones producing the toxin. Subsequent recloning (via plasmid pBR322) resulted in the isolation of a clone expressing the Shiga toxin and carrying a minimal DNA insertion fragment, while further recloning (plasmid pUC19) led to a series of subclones with various deletions that facilitated determination of the primary structure. The structural data led to identification of a certain degree of homology between the A chain of the Shiga toxin and the A chain of the plant ricin toxin. Furthermore, both toxins were found to share regions of homology with two domains of ribonuclease T_1, that responsible for substrate binding and that for catalytic activity. The significance of the homology with ribunuclease T_1 remains to be clarified. Figures 3; references 15 (Western).

12172/9716
CSO: 1840/966

UDC 547.963.32.07

SEMICHEMICAL SYNTHESIS OF PROCESSED BOVINE GAMMA INTERFERON GENE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 4, Aug 87 (manuscript received 18 Mar 87) pp 1016-1020

[Article by V.M. Rostapshov, I.P. Chernov, T.L. Azhikina and Ye.D. Sverdlov, corresponding member, USSR Academy of Sciences, Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] Technical details are presented on the transformation of a cloned gene for human gamma interferon into a bovine interferon gene. The lengths of the coding portions are 429 bp, while the respective interferons differ by 57 amino acids. In principle, the experimental approach consisted of five basic steps. Step I involved the cloning of the human gene in the single-strand phage M13. Step II consisted of the synthesis of an oligonucleotide chain complementary to the cloned gene sequence, followed by ligation of the synthesized oligonucleotides with the use of the cloned DNA as a template (Step III). Step IV involved isolation of the full oligonucleotide chain and synthesis of its complementary strand with DNA-polymerase and Step V consisted of cloning. The latter step involved pUC18 vector obtained with restriction enzymes XbalI and PstI. Figures 2; references 10: 1 Russian, 9 Western.

12172/9716
CSO: 1840/965

UDC 547.963.4:577.352.26

LIPOSOMALLY ENCAPSULATED HEME DERIVATIVES AND HEMOGLOBIN AS REVERSIBLE OXYGEN CARRIERS

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 4, No 6, Jun 87 (manuscript received 26 Jun 86; in final form 20 Feb 87) pp 565-589

[Article by I.P. Ushakova, G.A. Serebrennikova and R.P. Yevstigneyeva, Moscow Institute of Fine Chemical Technology imeni M.V. Lomonosov]

[Abstract] A review of largely Western literature is presented on current advances in liposomally-encapsulated heme and hemoglobin reversible oxygen carriers. Various preparations of heme derivates were tested for their function in liposomes prepared from a variety of lipid fractions showing that certain combinations offer promise as reversible oxygen carriers. The best liposomally-encapsulated derivatized hemes were capable of sustaining 100 oxygenation cycles. Studies on liposomally-encapsulated hemoglobins (hemosomes, neosomes) involved additional problems related to oxidation and denaturation of the protein component. However, efficient hemosomes have been prepared by the use of negatively charged phospholipids and cholesterol in addition to phosphatidylcholine. Generally, with 15% negatively charged phospholipids and oxyhemoglobin, stable liposomes were obtained that were found to function as efficient reversible oxygen and CO_2 carriers in animal studies. In addition, the experimental animals showed no evidence of damage to the internal organs. Figures 23; references 73: 11 Russian, 62 Western.

12172/9716
CSO: 1840/951

UDC 547.854+547.857+547.466

NUCLEOAMINO ACIDS AND NUCLEOPEPTIDES. PART 12. SYNTHESIS AND PROPERTIES OF ADENYLYLALANINE ANALOGS OF LEU-5-ENKEPHALIN

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 7, Jul 87 (manuscript received 3 Jun 86) pp 1647-1656

[Article by G.A. Korshunova, I.M. Dobkina, O.J. Ryabtseva and Yu.P. Shvachkin, Moscow State University imeni M.V. Lomonosov]

[Abstract A series of analogs of leu-5-enkephalin were synthesized, using L-beta-(adenylyl-N^9)-alpha-alanine (L-Aal) at position 4 of the pentapeptide. Biological studies identified compound III (H-Tyr-D-Ala-Gly-Aal-Leu-OMe) as being most promising in terms of eventual experimental and clinical applications. Compound III bound specifically to brain receptors for leu-5-enkephalin and was refractory to degradation by brain enkephalinase over a 2 hour period, while the natural congener was fully hydrolyzed in 15 minutes. Intraperitoneal administration of compound III (5 mg/kg) gave an anesthetic and analgesic effect for 1 hour in rats, while leu-5-enkephalin was ineffective under the same conditions. References 12: 7 Russian, 5 Western.

12172/9716
CSO: 1840/962

UDC 576.52

ELECTROFUSION OF FIBROBLASTOID CELLS

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 4, No 7, Jul 87 (manuscript received 30 Jan 87) pp 766-774

[Article by S.I. Sukharev, I.N. Bandrina, A.I. Barbul, I.G. Abidor and A.V. Zelenin, Institute of Electrochemistry imeni A.N. Frumkin and of Molecular Biology, USSR Academy of Sciences, Moscow]

[Abstract] Comparative studies were conducted with three electrofusion methods using mouse fibroblastoid cells (L-cells, clone L-929). Evaluation of the results demonstrated that dielectrophoresis of the cells or electrofusion of centrifuged cell sediments yielded fusion indeces of 0-15% in the different trials. The optimum method for electrofusion involved formation of a cell bilayer on a supporting film and application of a current perpendicularly to the support plane. Specifically, this system yielded a fusion index of 50-80% and involved the formation of a monolayer over a cellophane support, followed by the addition of more cells to form a bilayer and application of 2-3 kV/cm potential for 20-30 μsec. Similarly-high fusion rates were obtained with Chinese hamster cells (CHO, line 431), and mouse fibroblasts $C_3H10T^{1/2}$ cells. NaCl or KCl in concentrations of 30-100 mM had no adverse effects on fusion, while Ca-free media with 20-30% dialysed serum yielded 98% cell viability. Ultrastructural studies demonstrated that bilayer formation promoted formation of extensive intercellular contact that, presumably, facilitated fusion. Figures 4; references 22: 5 Russian, 17 Western.

12172/9716
CSO: 1840/953

UDC 577.352.465

STRAINED CONFORMATION AND ACTIVE ION TRANSPORT IN BACTERIORHODOPSIN

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 4, No 6, Jun 87 (manuscript received 20 Jun 86) pp 613-623

[Article by B.P. Ketis and R. Rozga, Vilnyus State University imeni V. Kapsukas; Institute of Semiconductor Physics, Lithuanian SSR Academy of Sciences, Vilnyus]

[Abstract] A mathematical description is provided of a proposed molecular model for energy transformation in bacteriorhodopsin based on piezoelectric effects. In the putative model for the light-dependent proton pump, the quantum process of trans-cis isomerization of retinal results in transformation of the energy of electronic excitation into mechanical energy. The protein component of bacteriorhodopsin sustains a strained conformation and, via its piezoelectric characteristics, transforms the mechanical energy into an electrochemical potential that may attain 3×10^8 V/m. Experimental studies using single-photon excitation of dried purple membrane films from Halobacterium halobium provided confirming information for the temperature-dependent photopotential kinetics. Figures 7; references 24: 17 Russian, 7 Western.

12172/9716
CSO: 1840/952

UDC 577.3

CYTOCHROME-R-450-DEPENDENT MONOOXYGENASES AND THEIR RELATIONSHIP WITH BIOLUMINESCENCE AND BIOCHEMILUMINESCENCE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 6, Jun 87 (manuscript received 2 Dec 86) pp 1477-1480

[Article by V.S. Danilov, Moscow State University, imeni M.V. Lomonosov]

[Abstract] A detailed study of bacterial luciferase has shown that it may be a multienzyme complex with cytochrome-R-450 as the terminal component. This hemoprotein can bond and oxidize not only luminescent reaction substrates such as aliphatic aldehydes with chain length 8-16 carbon atoms, but also many non-polar compounds. The hemoprotein is reduced by NAD (P)H-dependent electron transfer chains, the enzyme NAD(P)H:cyt. R-450 reductase. Another bioluminescent system, noncellular extracts from fungi, has been less studied. The bioluminescence of extracts from Armillariella mella is inhibited by CO, and is thus probably a cytochrome-Rh450-dependent monooxygenase. The reaction of luciferase is represented as luciferin + O_2 → products plus light. There is a close relationship between enzymatic chemiluminescence and peroxidation of lipids. Enzymatic biochemiluminescence of all the systems discussed in this article can be described as follows:

$$NAD(P)H + lipid + O_2 \xrightarrow[\text{flavin}]{\text{cyt. R-450}} NAD(P)^+ + product + light.$$

Bioluminescence of bacteria, fungi and chemiluminescence may be closely related not only physically, but also biochemically. The structural-functional system of such light-radiating enzyme systems is diagramed. Cytochrome-R-450-dependent monooxygenases are enzymes capable of generating light quanta. Figure 1, references 15; 6 Russian, 9 Western.

6508/9716
CSO: 18400919

UDC 591.174.3+598.2

LIMIT SIZE OF FLYING ANIMALS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 2, May 87 (manuscript received 3 Oct 86) pp 480-484

[Article by A.A. Borin]

[Abstract] A mathematical analysis was conducted to determine factors responsible for the fact that the body weight of flying animals is limited to 18 kg. Evaluation of muscle mass factors, as well as geometric configurations and kinematic parameters for different classes of flying animals led to definition of physiological constraints on body size. In the final analysis, body size limitations were found to be determined by the interplay of two conditions: the specific power requirements for flight showed a consistent increase with weight, while the disposable specific energy remains constant at low body weight (to ca. 1 kg), and thereafter decreases gradually. Figures 2; references 9: 4 Russian, 5 Western.

12172/9716
CSO: 1840/867

UDC 577.345

LINEAR DICHROIC SPECTRA OF POLYACRYLAMIDE GEL-ORIENTED CHROMATOPHORES OF GREEN SULFUR BACTERIA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 293, No 5, Apr 87 (manuscript received 17 Sep 86) pp 1259-1260

[Article by S.G. Kharchenko, I.A. Abdurakhmanov and Z.G. Fetisova, Moscow State University imeni M.V. Lomonosov]

[Abstract] An analysis was conducted on the linear dichroic spectra of a photoactive complex isolated from the green sulfur bacterium Chlorobium limicola, and arbitrarily designated as a chlorosomal-membrane complex. Theoretical and experimental studies yielded essentially identical results. All of the vectors of the Q_y-transition moments of bacterioviridin, which determine the absorption of the complex at 710-770 nm, were found to be

parallel and oriented along the long axis of the chlorosome immobilized in polyacrylamide gel. Figures 2; references 7: 4 Russian, 3 Western.

12172/9716
CSO: 1840/863

UDC 577.3

TOPOGRAPHIC CHARACTERISTICS OF PIGMENT-PROTEIN COMPLEXES IN CHLOROPLAST THYLAKOID MEMBRANES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 3, May 87 (manuscript received 17 Jul 86) pp 703-707

[Article by A.A. Asadov, I.S. Zulfugarov, S. Yu. Suleymanov and Dzh. A. Aliyev, academician, Azerbaijan SSR Academy of Sciences; Institute of Physics, USSR Academy of Sciences, Moscow]

[Abstract] Chloroplasts isolated from control and low-chlorophyll barley plants were employed in a spectroscopic study on the topography of pigment-protein complexes in thylacoid membranes. Graphical and descriptive data are provided on measurements of the 4th derivative of linear dichroic spectra and the absolute spectra of parallel and perpendicularly polarized light at 77 K, with their significance for structural features. On the basis of the data, a tentative disposition of the various elements is advanced, taking into consideration parallel and perpendicular orientations of the dipole moments of transition vis-a-vis the long axis of the photosystem particles. Figures 3; references 15: 6 Russian, 9 Western.

12172/9716
CSO: 1840/914

UDC 577.35

MICROCRYSTALLINE STRUCTURE OF THIOCAPSA ROSEOPERSICINA HYDROGENASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 2, Jul 87 (manuscript received 29 Jan 87) pp 509-512

[Article by M.B. Sherman, Ye.V. Orlova, Ye.A. Smirnova, N.A. Zorin, I.V. Tagunova, I.P. Kuranova and I.N. Gogotov, Institute of Crystallography (Moscow) and of Soil Science and Photosynthesis, (Pushchino, Moscow Oblast), USSR Academy of Sciences]

[Abstract] A study was conducted on the crystalline characteristics of hydrogenase isolated from Thiocapsa roseopersicina, in view of the importance of these enzymes to biofuel cells. Crystals were prepared by layering 20 µliters of 2% hydrogenase in 2 M MES buffer containing 10% 2-methyl-2,4-pentadiol and 0.5 M NaCl over 20 µliters of 4 M CsCl in 0.03 M MES buffer, pH 6.0. Examination under the electron microscope revealed two crystalline types identified as A and B. A was characterized by a = b = 11 nm and $\gamma = 60°$, while B was described by a = 20 nm, b = 11 nm, and $\gamma = 90°$. An

arrangement was proposed for the crystalline monolayers into 3-D crystals with the following possible symmetry groups: $P3_121$ ($P3_221$), $P6_122$ ($P6_555$), and $P6_322$ or $p6_3cm$ ($P6_3mc$). Figures 1; references 10: 5 Russian, 5 Western.

12172/9716
CSO: 1840/914

UDC 577.3:578.088

METHOD OF LOCAL ELECTROFUSION OF PRONUCLEI WITH ENUCLEATED ZYGOTE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 1, Jul 87 (manuscript received 17 Dec 86) pp 241-244

[Article by T.A. Sviridova, L.M. Chaylakhyan, corresponding member, USSR Academy of Sciences, V.A. Nikitin, and B.N. Veprintsev, All-Union Scientific Research Institute of Physiology, Biochemistry and Nutrition of Agricultural Animals, All-Union Scientific Research Institute of Agriculture, Borovsk, Kaluga Oblast; Institute of Problems of Information Transmission, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] The ability of cells to fuse has long been considered for use in gene engineering. Many works have suggested the use of single or multiple cell pair fusion. This work describes a method of producing reconstructed mouse zygotes by microsurgery and local electrofusion of pronuclei with an enucleated zygote. Experiments were performed on one-celled fetuses in the pronucleus stage. Reconstruction of zygotes was performed by the use of microsurgery to remove the pronucleus, after which the enucleated zygote was placed in contact with the karyoplast and electric stimulus was used to reconstruct the zygote. Successful electrofusion requires that the hydrophilic pores formed as a result of electric breakdown of the cell membrane contact each other, requiring that the pores in adjacent membranes be located opposite each other and that the pore diameters be significantly greater than the distance between the contacting membranes. An alternate electrofusion mechanism is suggested, in which the two adjacent membranes under the influence of the electrical pulses are merged into one at each contacting sector, irreversible breakthrough of which leads to fusion. To check viability, 30 zygotes of CBWA (albino) mice reconstructed by electrofusion were transplanted into the oviducts of receptive females. In three of eight females, one fetus developed with visibly different fur coloration from naturally born mice. These mice did not differ in growth or behavior from the natural progeny of the recipients, indicating that electrofusion causes no significant disruption of the genome. Figures 2; references 15: 4 Russian, 11 Western.

6508/9716
CSO: 18400920

GOALS OF BIOTECHNOLOGY

Moscow SELSKAYA ZHIZN in Russian 19 Apr 87 p 2

[Article by A. Sozinov, director, Institute of General Genetics, USSR Academy of Sciences; academician, All-Union Agricultural Academy imeni Lenin]

[Abstract] Some of the most promising developments in biotechnology will affect the agricultural sector as genetic engineering penetrates into crop and animal husbandry. Even now Soviet scientists have identified a number of proteins that are related to valuable crop characteristics, such as pest and disease resistance, winter hardiness, high temperature tolerance, and drought resistance. With the techniques of genetic engineering, new hybrid varieties can be produced to meet the climatic conditions of various regions of the USSR. Similarly, considerable stock improvement can be anticipated once such studies are applied on a large scale to farm animals. However, a serious approach to agricultural biotechnology requires appreciation of the need for a new type of research institutes and scientists. Changing the priorities of existing research establishments will not meet the challenge of the future. A totally new approach is required, akin to the heavy investments made by commercial companies in the West. Unless such efforts are undertaken on a serious basis, the USSR stands to fall behind in agricultural biotechnology.

12172/9716
CSO: 1840/891

GENETICALLY ENGINEERED INTERFERON

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Jul 87 p 4

[Interview with A. Strongin, All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, conducted by I. Nikorovich]

[Abstract] The joint efforts of the Institute of Genetics and Breeding of Industrial Microorganisms and the Institute of Bioorganic Chemistry imeni M.M. Shemyakin resulted in a genetically engineered analog of human leucocyte interferon. The engineered interferon differs from the native preparation in that greater dosages are required for an equivalent bioeffect, but this disadvantage is more than offset by the greater quantities that are available. For example, one liter of the engineered bacterial culture after 5-6 h of growth can produce an amount of interferon that is equivalent to that quantity that would be produced from 30-40 tons of human donor blood! The anticipation is that once clinical trials are completed large scale production of the bacterial interferon will be undertaken and it will eventually be available as a prescription drug.

12172/9716
CSO: 1840/942

SCIENTIFIC AND TECHNICAL COOPERATION IN BIOTECHNOLOGY

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian
No 4, 1987

[Article by Gavril Muska, director, Institute of Chemical and Biochemical Energetics, Bucharest]

[Abstract] Rapid advancements in the fields of genetic engineering and biotechnology have made mandatory efficient dissemination of information, as well as sharing of resources and reagents. To that end the COMECON countries have formulated and implemented a cooperative plan for assuring further scientific and technical progress. The cornerstone of this cooperative effort rests on international meetings, exchange of microbial strains, free access to scientific publications, training of highly qualified personnel and preparation of special courses for young scientists, and cooperative research ventures. In addition, plans have been made for establishing a cooperative data bank and computer programs for handling various technical, research, and economic questions that may arise.

12172/9716
CSO: 1840/883

HEALTH HAZARD AT BIOCHEMICAL PLANT IN KIRISHI

Moscow APN DAILY REVIEW in English Vol 33, No 110, 5 Jun 87 pp 1-2

[Article by A. Yezhelev, Izvestiya correspondent]

[Text] On Tuesday, June 2, production at the Kirishi biochemical plant of the USSR Ministry of the Medical and Biological Industry came to a complete halt. The inhabitants of the young city on the Volkhov River had been demanding its closure for a long time.

Agriculturists pinned great hopes on this plant, commissioned slightly more than ten years ago. The plant produced protein-vitamin concentrate.

But sometime after the opening of the plant, many people in Kirishi began suffocating, the bronchial asthma rate sharply increased and cutaneous and allergic diseases appeared due to the pollution of the air and the Volkhov and the acute decline in the general ecological situation.

The people of Kirishi rightfully demanded that concrete measures be taken to restore normal conditions. For a long time, representatives of the Ministry of the Medical and Biological Industry, the plant's managers and some local officials answered these demands by assurances that pollution did not exceed the maximum level, that malfunctions which led to protein leakage were being corrected and that there were no grounds for anxiety. Meanwhile production was increased.

The situation became especially tense after large emissions into the air in March. The issue of the closure of the polluting plant was raised with full grounds by the local newspaper Kirishky Fakel. An action committee was set up and it began persistent work for the solution of the problem. The Party City Committee and the City Council responded favorably to public demands.

On May 21, speaking at the meeting of the city's leading Party workers, managers and members of the public, Minister Valery Bykov tried to prove that the situation provided no grounds for concern. But under the pressure of irrefutable facts indicating the worsening of the ecological situation, he agreed to stop production beginning on June 2.

On Wednesday evening, a meeting of the plant's personnel and the city's Party and municipal workers was held at the plant. Problems of job placement of workers of the closed plant were discussed. Although there are still many unresolved issues, the authorities are going to ensure the workers' employment within a short time period, without infringing on their interests.

The Leningrad Region

(Izvestiya, June 4, Abridged)

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UDC 616.993.162-084:615.283.926

CHEMOPROPHYLAXIS OF ZOONOTIC CUTANEOUS LEISHMANIASIS WITH CHLORIDIN (PYRIMETHAMINE)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian
No 2, Mar-Apr 87 (manuscript received 1 Dec 86) pp 51-54

[Article by F.Ya. Khayrulin and Ye.A. Sabitov, Turkmen Scientific Research Institute of Skin Diseases; Ashkhabad Scientific Research Institute of Epidemiology and Hygiene imeni S.M. Dursunova, USSR Ministry of Health, Ashkhabad]

[Abstract] The potential efficacy of Chloridin in the prevention of cutaneous leishmaniasis is evaluated. In in vitro studies, Chloridin is found to inhibit the motor activity of promastigotes within 1 min when present in a 0.1% concentration, leading to clumping. Trials with outbred albino mice demonstrate that per os administration of 0.7 mg/kg Chloridin once per week for a month is effective in attenuating the clinical features of leishmaniasis, and lead to resolution of the infiltrations within 3 months. Gas pipeline workers in the endemic area treated with 0.02 mg Chloridin per week were protected from cutaneous leishmaniasis, whereas untreated workers presented with an incidence of 23%. Although of a preliminary nature, these observations indicate that Chloridin might be a promising agent in the prevention of cutaneous leishmaniasis. References 20 (Russian).

12172/9716
CSO: 1840/850

UDC 614.449.57:576.895.771.095.37:591.69

FIELD STUDIES ON INFESTATION OF ANOPHELES LARVAE WITH ROMANOMERMIS CULICIVORAX NEMATODES IN AZERBAIJAN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 87 (manuscript received 12 May 86) pp 62-65

[Article by V.V. Vladimirova, Ye.A. Pridantseva, A.N. Alekseyeva and G.U. Alirzayev, Institute of Medical Parasitology and Tropical Medicine imeni Ye.I. Martsinovskiy, USSR Ministry of Health, Moscow]

[Abstract] Three year (1982-1984) field trials were conducted in the Massalinskiy Rayon, Azerbaijan, on the infectiveness of anopheles mosquitoes with Romanomermis culicivorax larvae, to assess the possible use of the latter for biological control measures. Studies on parmanent and temporary water bodies demonstrated that under optimal conditions up to 96% of the Anopheles sacharovi, An. maculipennis and A. subalpinus larvae could be infected with 1-29 parasites. Highest incidence of infectivity was obtained with introduction of 1000-3000 nematode larvae/m^2 of water surface with a water temperature of 25-29°C. These observations suggest that under the conditions prevalent in Azerbaijan R. culicivorax may be a potentially useful biological control agent for malaria-transmitting mosquitoes. References 17: 2 Russian, 15 Western.

12172/9716
CSO: 1840/850

UDC 576.895.775:599:322.2(235.35)

PLAGUE TRANSMISSION BY NEOPSYLLA ABAGAITUI FLEAS IN TRANSBAIKAL

Leningrad PARAZITOLOGIYA in Russian Vol 21, No 3, May-Jun 87 (manuscript received 30 Jul 85) pp 500-501

[Article by G.A. Voronova, N.V. Gan and L.N. Yuzvik, Irbutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] In view of the high population density of the flea Neopsylla abagaitui in Southwestern Transbaikalia, a study was conducted to assess the possible role of this flea in plague tranasmission. Feeding and transmission studies and susliks and voles (Citellus dauricus, C. undulatis, Meriones unguiculatus, Microtus gregalis) demonstrated that Neopsylla agagaitui functioned as a transmission vector for the plague bacillus, with 1.1-1.5% of the specimens developing proventricular blocks. The plague bacillus was shown to persist in N. abagaitui in viable form for the duration of the 65 day period of observations.

12172/9716
CSO: 1840/849

CIVILIZATION AND NOVEL FOOD SOURCES. PART 2. THIRD STAGE OF FOOD TECHNOLOGY

Moscow KHIMIYA I ZHIZN in Russian No 6, Jun 87 pp 26-33

[Article by V.B. Tolstoguzov, doctor of chemical sciences]

[Abstract] The third stage in the revolution of food technology is concerned with the physicochemical and nutritive characteristics of nontraditional foodstuffs and supplements. Acceptable meat substitutes and supplements are now available from soybean meals and single-cell proteins, with special efforts made at ensuring satisfactory taste, color and olfactory perceptions. Intensive research is also being conducted for a more efficient utilization of the nutrient potential of plant biomass since, presently, only 1% is being utilized for food. It may also be anticipated that the progression from the first stage of food technology (hunting and gathering), to the second (growth/breeding and processing) and the third stages will eventually be accompanied by novel food forms--once inherent nutritional conservatism is overcome.

12172/9716
CSO: 1840/930

UDC 613.281:639.512]:613.29

LONG-TERM EVALUATION OF KRILL PROTEIN FOOD PRODUCT SERVING AS ANALOG OF SALMON FOODSTUFFS

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 87 (manuscript received 26 Aug 85) pp 59-61

[Article by Ye.A. Lebedeva, V.Ye. Artamonova, N.M. Zhukova, Ye.V. Loboda and A.V. Reyskanen, Chair of Nutrition Hygiene, Leningrad Sanitary Hygiene Medical Institute]

[Abstract] Outbred albino rats were employed in a nutritional assessment of a krill protein food product, for comparison with the results obtained with standard laboratory feed and 18% casein diet. Extensive physiological monitoring showed that animals kept on a diet supplying 18% of total daily calories from the krill protein displayed certain histochemical deviations from control animals. Hepatocytes of rats on the 18% krill diet presented

with marked enhancement of glycogen storage and absence of fatty vacuoles. No changes were evident with animals on diets in which 1.8 and 4.5% of the daily calorie needs were met by the krill product over a 12 month period. References 4 (Russian).

12172/9716
CSO: 1840/848

UDC 575.1

GENOTYPE DYNAMICS IN POPULATIONS OF PHYTOPATHOGENIC FUNGUS PHYTOPHTHORA INFESTANS (MONT.) DE BARY

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 3, May 87 (manuscript received 9 Dec 86) pp 696-698

[Article by I.N. Rybakova, L.M. Suprun and Yu.T. Dyakov, Moscow State University imeni M.V. Lomonosov]

[Abstract] An analysis was conducted on changes in aggressiveness and virulence of Phytophthora infestans on potato plants in Moscow Oblast to assess genotype dynamics. Phenotypic changes in the summer were attributed to clone selection on the basis of the rate of replication, and in winter on the basis of the survival rate. These two parameters which are, respectively, important characteristics of r- and K-selection are responsible for population dynamics in accordance with weather conditions. The higher values for the average number of virulence genes per clone for isolates obtained from crops as opposed to isolates from wild plants underscore the greater importance of r-selection in the agricultural setting. Figures 2; references 12: 8 Russian, 4 Western.

12172/9716
CSO: 1840/915

UDC 575.125

PEA-BREEDING FOR HIGH COMBINATIONAL EFFICIENCY BASED ON POLYLETHAL RECESSIVE CHLOROPHYLL DEFICIENCY GENE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 5, Jun 87 (manuscript received 19 Dec 86) pp 1228-1232

[Article by S.A. Gostimskiy, G.A. Khartina and A.M. Bagrova, Moscow State University imeni M.V. Lomonosov; Institute of Developmental Biology imeni N.K. Koltsov, USSR Academy of Sciences, Moscow]

[Abstract] Pea-breeding was carried out with the use of a polylethal recessive chlorophyll-deficiency gene in order to create an additive gene complex favoring increased viability and compensating for polylethality

[Strunnikov, VA, Zhurn. Obshch. Biol., vol 35, No 5, 1974]. Chlorophyll-deficient gene was provided by a low-viability (30-40%) mutant containing 30% of control chlorophyll concentration. Tabulated data on the breeding experiments demonstrated that breeding of the mutant with normal varieties and subsequent selection of superior hybrids led to improved survival figures for mutant plants. The superior viability of the mutants was due both to increased rate of germination and survival, as well as in all of the productivity parameters. The data was interpreted to indicate that selection of the plants for viability in the hybrid population carrying the chlorophyll-deficiency gene in the homozygotic state resulted in pronounced genetic rearrangements. These findings indicated that chlorophyll mutants may be useful in creating highly vigorous hybrid crops. Figures 1; tables 2; references 5: (Russian).

12172/9716
CSO: 1840/915

UDC 575.23:579.25

EXPRESSION OF HUMAN DIHYDROFOLATE REDUCTASE GENE INTEGRATED IN BACILLUS SUBTILIS CHROMOSOME

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 293, No 5, Apr 87 (manuscript received 24 Sep 86) pp 1249-1252

[Article by Ye.U. Poluektova, G.V. Savchenko, V.Z. Nezametdinova, F.K. Khasanov and A.A. Prozorov, Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] Cursory details are presented on genetic recombination experiments which secured the successful integration of the human gene for dihydrofolate reductrase in B. subtilis chromosome. The recipient cells were transformed with an integration vector designated as plasmid pGG514, using the appropriate cDNA carrying the gene from HeLa cells. Additional transformation with the B. subtilis were conducted to demonstrate and confirm the fact that the gene was on the chromosome and not on an autonomous plasmid. The marker was detected in virtually all of the recipient cells and was expressed for more than 100 generations. Figures 3; references 10: 4 Russian, 6 Western.

12172/9716
CSO: 1840/836

UDC 615.281:616.981.42-092.9

PRODUCTION OF ENDOGENOUS INTERFERON INDUCED BY BRUCELLA VACCINE IN ALBINO MICE

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 87 pp 58-61

[Article by K.S. Doskhozhayev, N.V. Pak, R.D. Aspetov, R.T. Murzatayeva, R.Zh. Ishchanova and I.Kh. Shuratov, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Kazakh SSR Ministry of Health]

[Abstract] Outbred mice were employed in an evaluation of a brucella vaccine certified for human use as an interferon inducer. Intravenous or intraperitoneal injection of 10^9 cells led to elevated serum interferon levels of interferon within 3 h (80-160 U/ml), reaching a peak in 6 h (640-1280 U/ml). After 24 h the levels fell to 10-20 U/ml, and thereafter disappeared. Concomitant studies on the liver, spleen, lungs, heart, and the brain showed the appearance of much lower levels of interferon, persisting for at least 96 h. Evaluation of administration schedules revealed that injections at 7 day intervals constitute the optimum schedule for maintaining high serum levels of interferon. More frequent administrations resulted in refractory animals due to the appearance of an endogenous repressor of interferon synthesis. Preincubation of the vaccine with antibodies had no effect on the vaccine as an interferon inducer, suggesting that an antibody response would not interfere with interferon production. These observations intimate that the vaccine might find clinical use in the management of patients with neoplasms or systemic viral diseases. References 5: 4 Russian, 1 Western.

12172/9716
CSO: 1840/860

UDC 615.373.3:579.861.2].012

ISOLATION AND INVESTIGATION OF ANTIBODIES AGAINST LETHAL FRAGMENT OF STAPHYLOCOCCAL ALPHA-HEMOLYSIN

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 87 (manuscript received 22 Jul 86) pp 24-25

[Article by I.A. Baschenko, Bashkir Branch, USSR Academy of Sciences, Ufa]

[Abstract] A study was conducted to determine optimum methods for production of antistaphylococcal antisera, relying on immunochemical analyses of the antihemolytic and neutralizing effectiveness of the different antibody populations directed against the various epitopes of staphylococcal alpha-hemolysin (SAH). SAH was fragmented by tryptic digestion, yielding 23, 17, 15 and 13.5 kDa fragments. A fraction lethal for albino mice was isolated from a Sephadex G-75 column and identified to contain the 23, 17 and 15 kDa components, and was subsequently used in adsorption studies for the isolation of anti-lethal and anti-hemolytic antibody populations from hyper-immune equine antiserum. Assessment of the results of neutralization studies, competive binding, antihemolytic results, and Ouchterlony gel diffusion demonstrated that the most efficient anti-SAH immune preparations are represented by antisera containing antibodies directed against the greatest number of SAH epitopes. Such antisera neutralize both the hemolytic and lethal activities of SAH by preventing binding with murine cell receptors. Consequently, preparation of efficient, immunochemically-pure antisera should be based on the use of the intact SAH molecule as an immunogen rather than any of its components. Figures 2; references 5: 3 Russian, 2 Western.

12172/9716
CSO: 1840/954

LASERS IN OPHTHALMOLOGY

Riga NAUKA I TEKHNIKA in Russian No 5, May 87 pp 14-15

[Article by Ivars Luksha, head, Latvian SSR Ophthalmological Laser Center]

[Abstract] It has been estimated that 40% of all ocular disorders are treatable by lasers and, in fact, some can only be treated by lasers. This fact provided an impetus to the establishment of the Latvian SSR Ophthalmological Laser Center at the Latvian Clinical Hospital imeni P. Stradynya. Developments and technical applications in the field have shown the utility of a number of different lasers in different situations, with the Nd-YAG lasers coming closest to what could be considered as ophthalmological laser with universal clinical application. The unique advantages offered by this laser lie in the fact that the emission wavelength may be varied virtually at will. Thus, for example, in the 532 nm modality it may be used for procedures requiring coagulation, while at 1064 nm it may be used in the perforating mode. Currently, clinical trials are underway with just such a Nd-YAG laser created jointly by physicists and ophthalmologists at the center. Figures 2.

12172/9716
CSO: 1840/877

UDC 577.391:599.32

AUTORADIOGRAPHIC EVALUATION OF LATE SEQUELAE OF HELIUM-NEON LASER EFFECTS ON ASEPTIC WOUNDS IN RATS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 87 pp 75-78

[Article by S.U. Urunbayev and S.I. Karabayeva, Alma-Ata State Medical Institute]

[Abstract] Autoradiographic studies were conducted on outbred albino rats to assess the effects of skin healing following aseptic resection of the sciatic nerve. In the experimental group, the site of the lesion was illuminated with a helium-neon LG-75 laser (19 mW, 3 mm diameter beam, 10 sec/day for 10 days). Prior to sacrifice the animals received

intraperitoneal injection of ^{3}H-thymidine. The autoradiographic and histologic studies revealed three major phases in wound healing. In the first phase (days 1-7) DNA synthesis was enhanced with proliferation of epidermal epithelial cells. In the second phase (days 14-30) the epithelial cells were almost completely depleted; DNA synthesis and the mitotic index showed marked depression. In the final phase of healing (days 60-90) DNA synthesis showed complete recovery to control baseline levels, as did the mitotic index. The helium-neon laser treated animals showed considerably enhanced DNA synthesis during the first 14 days, as well as enhanced mitotic index values over the first 30 days. Figures 1; references 7: 6 Russian, 1 Western.

12172/9716
CSO: 1840/860

UDC 591.186+599.537

DURATION OF EEG STAGES IN DOLPHIN CEREBRAL HEMISPHERES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 3, May 87 (manuscript received 12 Jan 87) pp 748-751

[Article by L.M. Mukhametov, A.I. Oleksenko and I.G. Polyakova, Institute of Evolutionary Animal Morphology and Ecology imeni A.N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Studies on one male and three female dolphins (Tursiops truncatus) revealed that there were no statistically-significant differences in the EEG patterns of the left and right cerebral hemispheres over a period of several days. At a given period of time one of the hemispheres may be 'asleep' for a longer period of time than the other (up to 1.5- to 2-fold longer), but the figures average out over longer terms of observation. Bilateral desynchronization on EEG (wakefulness) was evident during 66.6% of the observation time, while complete synchronization between both hemispheres was evident 2.6% of the time. The dominant form of sleep in the dolphins consisted of a slow-wave pattern in one hemisphere and desynchronization in the other. If all forms of bilateral and unilateral slow-wave patterns are regarded as representing sleep, then sleep may account for 33.4% of the time on a daily basis. In addition, one or the other of the hemispheres shows EEG evidence of sleep 19.0% of the time. References 7: 4 Russian, 3 Western.

12172/9716
CSO: 1840/916

UDC 591.185.5

AUDITORY CHARACTERISTICS OF BELUGA CETACEANS--DELPHINAPTERUS LEUCAS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 5, Jun 87 (manuscript received 29 Dec 86) pp 1255-1258

[Article by V.V.Popov and A.Ya. Supin, Institute of Evolutionary Animal Morphology and Ecology imeni A.N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Auditory characteristics of belugas (Delphinapterus leucas) were assessed in terms of short-latency auditory evoked potentials using two young

male specimens. With relatively high-intensity clicks (1-3 Pa) the response latency was on the order of 2.-2.2 msec, with the latency time to the peak of the major response components N_1, P_2, P_3, N_4, and N_5 being, respectively, 3.1, 3.7, 4.8, 5.0, and 6.4 msec. A maximum of ca. 10 μV response amplitude was obtained with the most intense stimuli. Threshold sensitivity was estimated at less than 10^{-3} Pa, while the frequency sensitivity band was limited to 110 kHz with an optimum band at 60-70 kHz. Minimal responses were obtained when the intervals between stimuli were maintained at 0.7-0.8 msec, with complete recovery of responsiveness with intervals of 15-20 msec. Figures 3; references 9: 5 Russian, 4 Western.

12172/9716
CSO: 1840/916

DOLPHINS AND HEALTH

Moscow KHIMIYA I ZHIZN in Russian No 4, Apr 87 pp 54-59

[Article by S. Starikovich]

[Abstract] The pleasure that dolphins give to humans generally overshadows the health risks that they face as a result of capture. In addition to the stress involved in the capture itself, the adverse effects of captivity may have been seriously underestimated. To that end more and more attention is being accorded to systemic physiological studies on dolphins to correct and prevent various clinical and clinically-inapparent disorders. Breeding programs have been successful, but the effects of such 'domestication' require more detailed analyses. In the wild, the dolphins face the danger of ever increasing pollution of the waters which they inhabit. All of these factors may threaten their eventual survival, and currently are the object of intensive research involving international cooperation. A popular-type drawing of whales and dolphins illustrates the mammals' head-structures, body-color and ways they help one-another in time of danger.

12172/9716
CSO: 1840/881

PLASMAPHERESIS CENTER AT MILITARY MEDICAL ACADEMY

Leningrad LENINGRADSKAYA PRAVDA in Russian 12 Jun 87 p 2

[Article by Ye. Rozhdenstvenskaya]

[Abstract] The plasmapheresis center at the Military Medical Academy imeni S.M. Kirov in Leningrad has to date carried out some 2000 hemapheretic procedures. The clinical results have attested to the effectiveness of the technique in detoxication and various substitution therapies relying on the formed elements of the blood. Education efforts are underway to expand the use, in the USSR, of this procedure and its various modifications. The center presently uses second generation Soviet instruments and equipment for hemapheresis and is willing to provide training in the procedures, provided that the apparatus becomes available at the major medical facilities.

12172/9716
CSO: 1840/886

MONOCLONAL ANTIBODIES IN TREATMENT OF ATHEROSCLEROSIS

Moscow ZNANIYE-SILA in Russian No 3, Mar 87 pp 16-18

[Article by S. Churov]

[Abstract] Advances in molecular medicine have identified low density lipoproteins (LDL) as one of the key factors leading to atherosclerosis. In the healthy individual, LDL molecules are removed by the liver, with the initial stage involving binding of LDL to specific receptors on the hepatocytes. However, in some individuals the number of such receptors that are specific for LDL are reduced in number, or even entirely lacking. In addition, the number of these receptors on the liver cells decreases with age. Any reduction in the numbers of such receptors on the liver cells is accompanied by increased risk of atherosclerosis. Recently, scientists at the All-Union Cardiological Research Center in Moscow have developed monoclonal antibodies against LDL. Large scale production of the antibodies was achieved by Candidate of Medical Sciences Ilya N. Trakht, in a project headed by the director of the institute Vladimir N. Smirnov. Beginning with 1984, clinical studies were undertaken under the direction of Valeriy V. Kukharchuk, doctor of medical sciences, which are designed to use such antibodies for the removal

of LDL from the bloodstream of patients with excessive LDL levels. The approach consists of coupling the antibodies to cellulose spheres, which then serve as an extracorporeal filter for removal of LDL from the blood. Currently, four patients are enrolled in the study, the results of which are under evaluation for clinical applicability.

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CSO: 1840/878

UDC 616.12-089.168-083-039.72:681.31

COMPUTERS IN POSTOPERATIVE CARDIAC INTENSIVE CARE

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 5, May 87 (manuscript received 14 Aug 86) pp 83-89

[Article by R.N. Lebedeva, A.A. Yeremenko, Yu.M. Mikhaylov and V.V. Abakumov, All-Union Surgical Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Seven years of experience with a computer system in a postoperative cardiac intensive unit have demonstrated the unquestionable utility of computers in such a setting in improving patient care. In addition to efficient patient monitoring and the resultant enhancement of clinical care in the intensive care unit, such systems also provide the opportunity for care history management and a permanent record for clinical research and evaluation. Analysis of 260 patients treated in a computerized cardiac intensive care unit have revealed no serious complications, while the incidence of life-threatening events in conventional units ranged from 2.4 to 3.6% over an equivalent seven year period of time. With the advent of computerized data processing in the intensive care unit, the patient-physician relationship has been modified into a physician-patient-computer triad, with the computer representing an indispensable medical modality in the service of the physician and the patient. References 21: 8 Russian, 13 Western.

12172/9716
CSO: 1840/932

UDC 615.21:616.891

MODELING OF PSYCHOSES WITH d-LYSERGIC ACID DIETHYLAMIDE

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 40, No. 2, Feb 87 pp 116-123

[Article by R.R. Safrazbekyan, Institute of Fine Organic Chemistry imeni A.L. Mendzhoyan, Academy of Sciences of the Armenian SSR: "Modeling of Psychoses With d-Lysergic Acid Diethylamide"; submitted for publication 12 Nov 1985; the first paragraph is a summary]

[Text] The effect of d-lysergic acid diethylamide on animal behavior and the metabolism of monoamines is discussed. It is shown that behavioral disturbances induced by LSD are, to a certain extent, due to an inhibition of serotoninergic structures.

Keywords: hallucinogens, lysergic acid diethylamide, catecholamines, serotonin, experimental psychosis

D-lysergic acid diethylamide (LSD-25 or LSD) is well known to be one of the most active hallucinogens. The hallucinogenic effect of LSD was first discovered in 1943 by Hoffman as a result of accidental poisoning in the course of synthesis of lysergic acid derivatives. LSD poisoning manifests itself as acute psychic disturbance with distinct visual hallucinations. The hallucinations often have a pulsating pattern corresponding to the rhythm of respiration or heartbeat. Mood disturbances (euphoria or depression), distortion of time perception and body image are also observed. At minimal LSD dosages (50-100 μg internally) the first signs of poisoning and, in particular, a dilatation of the pupils (mydriasis) appear after 20 or 30 min. There is intensified salivation and perspiration, nausea and often fever. Modifications of internal organs are usually insignificant. Psychosis develops gradually, achieving a peak at 1.5-2.5 hr and continuing for 9-10 hr. A single-time administration of LSD does not cause a weakening of memory, orientation or consciousness [1, 21, 5, 43, 51].

LSD induces alterations of the general behavior, which can be regarded as equivalents of its psychomimetic action. Many pharmacologic effects of the preparation are due to an influence on the metabolism of biogenic amines. LSD is well known to have the capacity of suppressing the response of organs and tissues to the administration of serotonin [6, 7, 21, 23, 26, 44].

There have also been reports, however, that it can imitate the effects of serotonin (5-OT), noradrenaline (NA) and adrenaline [34, 35, 47]. The present paper describes the modifications in animal behavior associated with an alteration in the metabolism of 5-OT, NA and dopamine (DA).

After intraperitoneal injection of LSD (0.2-10 mg/kg) to rats, 0.2-0.4% of the drug appeared in the brain after 15 min. LSD disappeared from the brain rapidly, mainly within 30 min. The drug is excreted from the bodies of rats, guinea pigs and monkeys by the gastrointestinal tract, kidneys and lungs, mainly in the form of metabolites. The rate of metabolism varies widely for different species. While in mice LSD half-life is just 7 min, in monkeys and cats it is 100 and 130 min, respectively. The half-life of LSD in human plasma is 175 min [3, 16, 42, 48, 49].

LSD injected into mice in a dose of 2 mg/kg stimulates motor activity, enhances auditory and tactile sensitivity, causes an expansion of the pupils and piloerection [37]. In rats a dosage of 150-500 μg/kg (subcutaneously) induces mydriasis, piloerection, hurried breathing and enhanced response to auditory and tactile stimulation during 10 min. The animals then become less mobile, and after 60 min catalepsy develops. Dosages of 1-4 mg/kg (intraperitoneally) of LSD caused in rats reciprocal contractions of the anterior extremities, head tremor or shaking of the head from side to side and abduction of exterior extremities [42, 43, 53, 60]. This syndrome and the 5-OT-dependent behavior is characteristic of tryptophan (a predecessor of 5-OT), 5-methoxy-N,N-dimethyltryptamine (5-OT agonist), n-chloramphetamine (which releases 5-OT) and other substances which enhance the functional activity of serotoninergic structures [10-12, 25, 28, 52]. A dose of 100 μg/kg (intravenously) of LSD caused a dilatation of the pupils, hurried respiration, intensified motor activity and a higher rectal temperature in rabbits. The excitation subsided within 2 hr and hyperthermia within 6 hr [27].

LSD in dosages of 10-400 μg/kg (intraperitoneally or intravenously) induced in cats mydriasis, tearing, salivation and intensified exploratory response (exploring, sniffing and slightly biting surrounding objects) and aggressiveness. After the administration of the drug, the frequency of episodes of washing and head and body shaking is increased by several times. The symptom of abortive washing and shuddering of anterior extremities is characteristic. In cats given sodium chloride solution, the shuddering motion of anterior extremities is observed only sporadically and not in all animals. After LSD was administered to the same animals, the frequency of this symptom increased by many times. The effect correlated with the drug dosage. In particular, a dose of 50 μg/kg was associated with an average of 46 tremors per hour. The frequency of the symptom decreased over time, but even after 4-8 hr it was far above the control level (25-9 per hour). With a dose of 110 μg/kg the symptom is less pronounced and disappears earlier. With a dose of 2.5 μg/kg, comparable to a hallucinogenic dose, LSD increases the frequency of shaking of anterior extremities without inducing any other behavioral disruptions. The shaking of extremities has also been observed after inhibition of 5-OT synthesis or administration of large doses

of methysergide, an antagonist of 5-OT. In dosages of 10-100 μg/kg LSD causes hallucinatory behavior in cats: with a gaze fixed in space, the animals attempt to catch, hit or bite imaginary objects [14, 29, 43]. In intact animals, hallucinatory behavior, abortive washing and shaking of extremities do not occur or are extremly rare. This complex of alterations can be described as a symptom of "abnormal behavior."

Three hours after administration of 3 mg/kg of LSD, no alterations in the endogenous NA content were observed in mouse brain [38]. The data on LSD effect on amine content in rat brain are ambiguous. In particular, Peters [9] and Sloviter et al. [53] observed no significant changes in NA content at 30 and 10 min after administration 0.5-4 mg/kg LSD. On the other hand, there are definitive data indicating a substantial (by 10-20%) drop of NA level in the brain of rats administered 0.2-2 mg/kg of LSD. The action of the hallucinogen was distinct after 20 min and continued, depending on the dosage, for 20 to 120 min [18, 31, 32, 54, 55]. A substantial decrease (by 20%) of NA content in the brain was observed in long-term experiments after LSD was administered to rats for 14 days with 20 and 120 μg/kg daily [9]. A depletion of NA in rabbit brain was also observed after a single administration of the drug: by 30% at 2 hr and by 55% at 6 hr [18]. A higher NA content caused by pargyline--an inhibitor of monoamine oxidase (MAO)--is potentiated by LSD in a dose of 100 μg/kg/day, suggesting an accelerated amine cycle [9].

At 20 min after LSD administration (intraperitoneal, 1300 μg/kg), the content of [^{3}H]-NA introduced intravenously declined in rat brain. This was associated with the formation of radioiactive O-methylated and deaminated metabolites. After 4 hours the concentration of [^{3}H]-NA and its metabolites declined by approximately 20%. The action continued for up to 6 hr. LSD could also enhance the specific activity of NA in the brain of rats given [^{3}H]-l-tyrosine, i.e., intensifies the inclusion of l-tyrosine in NA [54].

In the brain of mice administered 3 mg/kg of LSD, no modifications in DA concentration were observed after 3 hr [38]. In rats a slight but reliable rise in DA level in the brain was registered 40 min after the drug was administered in doses of 200-1300 μg/kg [31, 32]. Even a dose of 25 μg/kg of LSD increased in the near-frontal cortex the concentration of homovanillic acid--a product of extraneural DA metabolism. Administration of the hallucinogen for several days raised the level of homovanillic acid also in the striate body [8]. LSD injected into rats in doses of 0.5 and 1 mg/kg increased after 45 min the catecholamine fluorescence in the neurons of the brain septum [13]. The authors of [13] do not specify which catecholamine accumulates in the neurons. One can hypothesize that the intensified fluorescence is associated with a heightened DA content, because, as has been noted above, LSD depletes NA reserves. In the brain of rats given LSD in a dose of 500 μg/kg, within 30 min Peters [39] observed no alterations in tyrosine concentration or tyrosine hydroxylase activity. However, Tong and Leonard [57] observed at 3 hr after injection of 100 μg/kg a rise in tyrosine concentration in the brain and its reduction in the blood. The effect developed after 20 min. LSD introduced into rats for

14 days in a dose of 20 μg/kg per day inhibited in the brain the activity of tyrosine hydroxylase considerably (by 12-18%); a dose of μg/kg per day also reduced tyrosine concentration [39].

Intraperitoneal (130-1300 μg/kg) or intravenous (200 μg/kg) injection of LSD into rats or rabbits caused a substantial rise of brain concentration of endogenous 5-OT: on average by 25 and 13-40%, respectively.{1} A dose of 25-50 μg/kg raised the concentration of 5-OT in dog brain [17-20, 30, 31, 42, 50, 56]. In rats given LSD (100 μg/kg), the concentration of 5-OT in neurons of medial or dorsal nuclei of the interstitial brain suture rose 1 hr postinjection [24]. A dose of 500 μg/kg of LSD inhibited the rise in 5-OT level induced by pargyline, indicating a reduced rate of amine cycle [39].

After the administration of 130-1300 μg/kg of LSD, the overall level of "bound" 5-OT associated with particular fractions rose in rat brain homogenate. The quantity of cytoplasmic "free" amine did not change, but the ratio of "bound" 5-OT to "free" 5-OT increased. This ratio, which normally is 2.4, rose after LSD injection to 3.6 [17-19, 42, 45].

In vitro experiments LSD (10^{-6} M and 2×10^{-4} M) inhibited spontaneous and stimulation-induced release of [^{3}H]-5-OT from rat brain sections. A dose of 520 μg/kg also suppressed the release of [^{3}H]-5-OT [9, 61].

After 30, 60 and 120 min post-LSD (200-1300 μg/kg or 10 μg/kg), the concentration of 5-oxyindolacetic acid (5-OIAA), a product of deamination of 5-OT, was greatly reduced in rat brain. LSD prevented a rise of 5-OIAA concentration in the rat forebrain at electric stimulation of the suture area [17, 20, 31, 39, 41, 42, 56]. At the same time, it did not affect deamination of 5-OT in the brain [17, 20] but inhibited MAO activity with respect to adrenaline [46].

The content of tryptophan, a 5-OT predecessor, declined in the blood and rose in the brain at 3 hr after administration of 100 μg/kg of LSD. The hallucinogen (500-520 μg/kg) did not affect the activity of brain tryptophan hydroxylase and the synthesis of 5-OT from 5-oxytryptophan [17, 31, 39, 57]. A dose of 1 mg/kg suppressed the inclusion of radioactive tryptophan in 5-OT [33], an indication that the rate of the amine cycle was reduced.

In long-term experiments, where rats received 20 μg/kg of LSD per day for 14 days, a slight rise of 5-OT concentration in the brain and a considerable (by 25%) drop of 5-OIAA level was observed 24 hr after the final injection. The administration of 20 μg/kg of LSD per day prevented an increase in 5-OT levels by MAO inhibitor pargyline. These modifications suggest that the 5-OT cycle was suppressed. A dosage of 100 μg/kg/day of LSD in similar experiments activated the amine cycle; while leaving 5-OT concentration unchanged it raised greatly (by 35%) 5-OIAA concentration in the brain and potentiated the effect of pargyline. However, 2 weeks after the final injection of 100 μg/kg/day 5-OT concentration in the brain rose substantially, which, since the 5-OIAA level remained unchanged, indicated an

accumulation of amine. These alterations could be responsible for the recurrence of certain LSD effects ('flashbacks') a long time after the disappearance of the immediate effects of the drug in man [39, 40].

The catecholamine synthesis inhibitor α-methyl-p-tyrosine prevented sympathomimetic effects of LSD in rabbits. However, the depletion of catecholamine reserves both by α-methyl-p-tyrosine and 6-oxydopamine did not prevent LSD effect on motor activity in mice and on the behavior of rats. The depletion of 5-OT content by p-chlorophenylalanine or 5,7-dioxytryptamine also did not influence the LSD effects in rats. On the other hand, a dose of 200 μg/kg of LSD counteracted the reduction of 5-OT content by p-chlorophenylalanine, but did not prevent the action of α-methyl-p-tyrosine on catecholamine reserves [32, 37, 38, 53, 56]. A preliminary introduction of LSD prevented the depleting action of α-propyldopacetamide (N-22/54, an inhibitor of tyrosine- and tryptophan hydroxylase) upon 5-OT content but accelerated the depeletion of NA [4], indicating a slowdown of the 5-OT cycle and acceleration of NA metabolism.

In rats, the behavioral effects of LSD were counteracted by BOL (diethylamide of d-2-bromolysergic acid), known as a 5-OT antagonist. After BOL administration (10 mg/kg) the dose-response curve of the behavioral LSD effects was shifted to the right, toward higher dosages [53]. As a small dose (1.8 mg/kg) of BOL was administered during an hour, the LSD-induced accumulation of 5-OT in the brain was suppressed by 50% [18]. Phenoxybenzamine (dibenziline), an antagonist of 5-OT in peripheral organs [22], injected in a dose of 15 mg/kg prevented the development of behavioral or autonomic dysfunctions caused by LSD in cats [14].

The neuroleptic aminazine, administered to cats for 4 days (5 mg/kg daily), suppressed almost completely all behavioral and autonomic disruptions caused by LSD. In rats a single-time administration of aminazine (2 mg/kg) reduced by 60% the LSD-provoked rise of 5-OT concentration [14, 18].

In mice, the administration of LSD (0.1 mg/kg and more) 4 hr after reserpine caused hyperactivity, body spasms, tremor and stereotypic sniffing. In cats treated with reserpine for 6 days (0.5 mg/kg/day), the hallucinogen had an awakening effect. Reserpine did not influence the development of the behavioral effects of LSD. On the other hand, LSD administered 18-20 hr after reserpine accelerated the recovery of depleted reserves of 5-OT, raising the content of amine in particulate fractions [14, 17-19, 38, 42, 45].

The cholinolytics atropine, scopolamine and hexamethonium chloride did not influence the behavioral effects of LSD in cats, although to various degrees they inhibited its influence on the autonomic nervous system [14].

LSD thus produces a sympathomimetic effect and causes behavioral changes consisting of the following components: intensified motor activity, 5-OT-dependent behavior and "abnormal behavior." Depending on LSD dose and animal species, one or the other is predominant.

When given in doses disrupting the behavior of the animals, LSD interferes with monoamine metabolism in the CNS, apparently disrupting the balance between catecholamines and indolylamines, and raising the speed of NA cycle in the brain, as indicated by intensified release of [^{3}H]-NA, a decline in the level of endogenous NA and an increase in the inclusion of labeled tyrosine in NA. The sympathomimetic effects of LSD appear to be a result of an intensified extraneural release of NA.

Under the effects of LSD the 5-OT cycle rate is increased: The endogenous level of amine rises and the 5-OIAA concentration declines; the inclusion of labeled tryptophan in 5-OT slows down and the release of [^{3}H]-5-OT by electric stimulation of brain sections declines.

As has been noted, 5-OT-dependent behavior induced in rats by LSD is prevented by 5-OT antagonists but not by a depletion of amine reserves. Obviously, the syndrome is caused by the direct stimulative action of LSD upon postsynaptic serotoninergic receptors. On the other hand, the intensified binding and accumulation of 5-OT in neurons could be due to stimulation of presynaptic serotoninergic autoreceptors, which regulate the synthesis and release of amine. There are indications suggesting that presynaptic receptors of 5-OT are more sensitive to LSD than are post-synpatic receptors [26]. A participation of presynaptic α-adrenergic heteroceptors located on serotoninergic nerve endings also cannot be ruled out; the excitation of these receptors suppresses the release of 5-OT [15, 36].

An "abnormal behavior" in rats is provoked not only by LSD. As has been stated earlier, the syndrome can develop as a result of inhibition of 5-OT synthesis or administration of large amounts of the amine antagonist methysergide. The syndrome also develops after many-day administration of d-amphetamine, which drastically depletes the reserves of 5-OT, DA and their metabolites [29, 58, 59]. These observations suggest that the "abnormal behavior" caused by LSD is at least partially induced by an inhibition of the functional activity of serotoninergic structures. Obviously, this is a manifestation of the effect of LSD as an antagonist of 5-OT. An influence of the hallucinogen on dopaminergic structures also cannot be ruled out.

FOOTNOTE

1. Sloviter et al. [53] observed no alteration in 5-OT concentration (or of NA or DA) in rat brain 10 min after injection of 1-4 mg/kg of LSD. It is possible that these discrepancies are due to the choice of the line of animals or their age: Unlike most authors, who observed LSD effects in young animals (100-200 g), Sloviter and collaborators used mature individuals (250-400 g).

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ANTITUMOR ACTIVITY OF MIXED CARBOXYLATE COMPLEXES OF PLATINUM (II) WITH AMMONIA AND CYCLOAKYLAMINES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 3, May 87 (manuscript received 11 Nov 86) pp 726-730

[Article by A.L. Konovalova, P.A. Cheltsov, A.N. Kravchenko and R.N. Shchelokov, All-Union Oncologic Scientific Center, USSR Academy of Medical Sciences; Institute of General and Inorganic Chemistry imeni N.S. Kurnakov, USSR Academy of Sciences, Moscow]

[Abstract] The use of medications such as cisplatin and platidiam has improved the results of treatment of patients with tumors of the ovaries and testes, squamous-cell cancers of the head and neck. However, serious side effects have forced a search for new complex platinum compounds with lower toxicity and less cross resistance. In an attempt to find soluble and active compounds, the authors synthesized mixed ammonia-cycloalkylamine carboxylate complexes containing anions of malonic, tartonic, succinic and malic acids. The antitumor activity was studied with lymphoid leukemia, hemocytoplastosis, ascitic hepatoma, plasmocytoma, mammary adenosarcoma, pulmonary carcinoma and cervical cancer. The compounds had clear antitumor activity, particularly for adenocarcinoma, plasmocytoma and hepatoma. The four- and five-membered alicyclic amines were most active; complexes with cyclopentyl amine are of greatest practical interest. Malate complexes with labile seven-membered carboxylate ring have broader antitumor spectrum and are highly effective on both compact tumors and hemoblastoses. A clear relationship is observed between antitumor activity and size of alicycle in the amine portion of the molecule and carboxylate ring. Compounds are found with more than 100 times higher solubility than cisdichlorodiaminoplatinum. References 15: 1 Russian, 14 Western.

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CSO: 18400921

UDC 612.014.424.5+616-001.2-085.7]-092.9

CHEMOTHERAPY OF ACUTE MICROWAVE EFFECTS: EXPERIMENTAL DATA

Moscow BIOLOGICHESKIYE NAUKI in Russian No 1, Jan 87 (manuscript received 10 Nov 85) pp 20-26

[Article by V.M. Koldayev, Chair of Biophysics, Vladivostok Medical Institute]

[Abstract] A literature review is presented of the current status of pharmacologic reversal of the acute effects of high-intensity (10-15 mW/cm^2) microwave irradiation. The attempts at reversal were based on the fact that the effects of microwaves are based on heat generation in the body and the specific target organs and tissues. The fundamental conclusions that have been reached to date indicate that preventive measures should be directed at the use of CNS depressants, agents inhibiting interoceptive reflexes and antihypoxic factors. Management of cases after exposure should emphasize stimulation of the respiratory and cardiac centers of the medulla oblongata, stimulation of the higher centers of the CNS, maintenance of blood pressure, enhancement of heart function via cardiac glycosides and support of energy metabolism via appropriate vitamins and hormones. References 25: 15 Russian, 10 Western.

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UDC 615.281:547.439

SYNTHESIS AND BACTERICIDAL PROPERTIES OF CYMANTRENE DERIVATIVES OF DIHYDRIC ACETYLENE ALCOHOLS

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 126, No 2, May 87 (manuscript received 28 Nov 85) pp 413-416

[Article by L.P. Asatiani, Z.Sh. Lomtatidze, S.Kh. Koladze and R.A. Tedoradze, Tbilisi State University]

[Abstract] Dihydric cymantrene alcohols in the acetylene series were synthesized by reaction of acetyl- and benzoylcymantrene with Mg-Br derivatives of acetylene alcohols in ether. The products, 1-cymantrenyl-1-phenyl-1,4-dihydroxybutyne (I), 1-cymantrenyl-1-methyl-1,4-dihydroxy-4-propyl-2-heptyne (II), and 1-cymantrenyl-1-phenyl-1-hydroxy-3-(1-hydroxycyclohexyl)-2-propyne (III), were tested for inhibitory activity against phytopathogenic bacteria and actinomycetes. The three compounds were found to inhibit growth of the bacteria Pectobacterium aroideae, Xanthomonas campestris, and Bacterium tumefaciens. Compound I was shown to inhibit the growth of Streptomyces sp. and Nocardiophis sp., compound II was effective against Nocardiophis sp., while III was ineffective against either actinomycete. References 4 (Russian).

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ERYTHROCYTES AS DEPOTS AND CARRIERS OF INSULIN

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 103, No 2, Mar-Apr 87 pp 207-216

[Article by L.I. Sandulyak, Chernovtsy State University]

[Abstract] Recent studies have increased our appreciation of the role of erythrocytes in storing and in transporting insulin, and the impact that this phenomenon has on intermediary metabolism. In the human system, approximately 70% of the erythrocytes have been shown to contain insulin, a percentage that diminishes with increasing age. The erythrocyte-insulin component represents a finely tuned system that responds immediately to changes in blood sugar levels, with the erythrocytic insulin promoting metabolism of excess carbohydrates via the pentose phosphate pathway. Both glucose and lactic acid function to cause insulin release from erythrocytes, while uptake by erythrocytes is favored by GABA. Internalization of insulin by erythrocytes is an energy-dependent process that can be arrested by agents having an inhibitory effect on glycolysis. Figures 1; references 69: 56 Russian, 13 Western.

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CENTRAL AND PERIPHERAL SIGMA OPIOID RECEPTORS

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 103, No 2, Mar-Apr 87 pp 217-228

[Article by N.N. Samovilova and V.A. Vinogradov, Scientific Research Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] A review is presented of current research data on the sigma opioid receptors, with the general notation that the function of these receptors and their specific endogenous ligand remain enigmatic. At both CNS and visceral sites the sigma receptors bind SKF 10047, an antagonist that

competes with phencyclidine. However, none of the endogenous opioids nor such neurotransmitters as the catecholamines, glutamate, serotonin, GABA, or acetylcholine bind to the sigma receptors. On these grounds their classification as opioid receptors appears tenuous. Intensive investigations are presently being conducted to find the putative endogenous 'sigmaergic' ligand. Such endogenous ligands may be expected to exhibit antipsychotic effects in analogy to the effects of some of the agent reacting with the sigma receptors. References 99: 2 Russian, 97 Western.

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UDC 543.8:543.9:577.16.08

BIOAMPEROMETRIC DETERMINATION OF BLOOD CHOLESTEROL

Moscow ZHURNAL ANALITICHESKIY KHIMII in Russian Vol 42, No 3, Mar 87 (manuscript received 4 Nov 85) pp 542-546

[Article by Yu.Yu. Kulis, M.V. Peslyakene, V.-S.A. Laurinavichyus, L.Ya. Petrova, O.I. Glubokovskaya and A.A. Selezneva, Institute of Biochemistry, Lithuanian SSR Academy of Sciences, Vilnyus; All-Union Scientific Research Institute of Antibiotic and Enzyme Technology, Leningrad]

[Abstract] An amperometric method was devised for determination of blood cholesterol levels, using a H_2O_2 electrode and cholesterol oxidase isolated from Streptomyces lavendulae. Evaluation of the system showed that optimal analytical conditions required a 0.01 M phosphate buffer, pH 7.2, 0.1 M KCl with 7 mM sodium azide, and 0.2% sodium deoxycholate. For analysis 0.3-0.5 U cholesterol oxidase were added after the blood sample. The deoxycholate served to lyse the erythrocytes, while the azide served to inactivate the catalase released from the erythrocytes. The system was successfully tested on human, bovine and rat blood samples, and was suitable for cholesterol concentrations in the 0.1 and 8 mM range. Figures 5; references 7: 3 Russian, 4 Western.

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MONITORING BRAIN FUNCTIONAL STATE

Moscow PRAVDA in Russian 29 Jul 87 p 3

[Article by O. Gazenko and P. Kostyuk, academicians]

[Abstract] Scientists at the Institute of Higher Nervous Activity and the Institute of Neurosurgery imeni N.N. Burdenko have developed a detailed research program for monitoring the functional status of the brain. The parameters under evaluation include the EEG, EKG, eye movements, acoustic indicators of emotional components of speech, and so forth. The practical applications include analysis of the performance potentials of human controllers and also clinical applications in the prognosis of the outcome of therapeutic measures in brain damage. The brain monitoring project represents a unique multifaceted approach to brain function, and is deemed certainly suitable for consideration for the USSR State Prize.

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UDC 611-018

DYNAMICS OF STRUCTURAL TRANSFORMS OF SKELETAL MUSCULAR TISSUE AUTOTRANSPLANTED TO CEREBROSPINAL CANAL IN RATS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 5, Jun 87 (manuscript received 12 Jan 87) pp 1221-1224

[Article by R.L. Zhenevskaya and Ye.I. Motskobili, Institute of Evolutionary Morphology and Animal Ecology imeni A.N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Experiments involving transplantation of muscle fragments into various segments of the central nervous system are of great interest in the study of the mutual influence of nerve and muscle tissue on their plastic activity. Transplantation of skeletal muscle into the rat brain has demonstrated the formation of regenerating muscle fibers which intergrow with the nerve fibers. This article traces processes occurring in transplanted muscle fragment in the cerebrospinal canal and describes all stages of its restructuring. Experiments were performed on 54 white rats in which a fragment of skeletal muscle was autotransplanted in the lumbosacral segment of the cerebrospinal canal. Histologic studies were performed five to 45 days after the operation. The transplantates were found to be capable of progressive development with the formation of differentiated transversely-banded muscle fiber in contact with regenerating spinal cord nerve fibers. Lack of functioning causes atrophy of the newly formed muscle fiber, which is replaced with connective and fatty tissues, apparently a result of the insufficient quantity of transplanted material for secondary development of "muscle" type transplantate. The results indicate realistic possibility of interaction between skeletal muscle and nerve tissues under these conditions and possible stimulation of regenerative activity by means of regenerating muscle tissue. Figure 1; references 8: 6 Russian, 2 Western.

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STIMULATION OF PROTEIN SYNTHESIS IN RAT CEREBRAL CORTEX AFTER HYPOXIA BY TRANSPLANTATION OF EMBRYONAL NERVE TISSUE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 294, No 6, Jun 87 (manuscript received 13 Jan 87) pp 1473-1476

[Article by L.V. Polezhayev, M.A. Aleksandrova, V.N. Vitvitskiy, L.V. Cherkasova, I.N. Saburina and S.V. Girman, Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] Transplantation of embryonal nerve tissue into the rat brain following hypoxia causes significant normalization of dystrophic neurons. This article studies how the intensity of protein synthesis changes in brain tissue and its neurons after hypoxia and transplantation of embryonal nerve tissue by the methods of autoradiography and biochemistry using radioactive isotopes. Studies were performed on 42 Wistar rats. Autoradiography showed that after hypoxia the rate of protein synthesis was statistically reliably reduced. Transplantation of embryonal nerve tissue caused a statistically-reliable increase in protein synthesis in both hemispheres within four days after transplantation, the level of synthesis remaining high to the end of the experiment at 120 days. Introduction of embryonal nerve tissue thus resulted in normalization of a significant portion of the dystrophic neurons and prevention of their death, with increased protein synthesis in the neurons and other tissues of the brain. This information is of both theoretical and practical importance for medicine, particularly neurology and psychiatry. Figures 2; references 6: 3 Russian, 3 Western.

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DEFICIENCIES IN DRUG SUPPLY AND EQUIPMENT

Moscow IZVESTIYA in Russian 4 Feb 87 p 3

[Article by V. Rykov, manager of central pharmacy No 112, Temirtau, Karaganda Oblast: "And How Is It in a Pharmacy"]

[Text] Every morning I hasten to my pharmacy. I love my work. It requires special precision and a strict observation of orderliness. It is not for nothing that when one wants to boast about something that has been done neatly, on time, and accurately, one says approvingly: like in a pharmacy.

But in fact how is it in the pharmacy? What is the work situation for pharmacists, dispensers, checkers, wrappers, and other personnel?

Pharmacy No 112 which I manage, is one of largest in Temirtau. Our city, where most of the people are metallurgists and chemists, is a young city that is growing at a rapid pace. There are many children in Temirtau. Our pharmacy is compelled to operate under a heavy workload.

Here I shall take the liberty of posing the question: What is a pharmacy today? I would probably hear an answer to the effect that a pharmacy is an important sector of health protection and one of the most essential medical institutions. Yes, that is so. But above all a pharmacy is a commercial facility and a commercial-financial plan is "sent down" to that facility every year. How is that plan formulated? Is it based on the morbidity forecasts for the following year? Or is it based on the pharmacies' own "estimates" and requisitions?

No. As is the practice for all commercial institutions, the plan is based on "what was achieved" last year, and on higher levels. Last year our plan was in excess of 360,000 rubles. That was an unrealistic figure. During all the preceding years our retail commodity turnover rate of increase was raised by three to five percent annually. It was difficult, but somehow we managed to cope with it. But when a 10 percent growth in earnings was planned for us last year, we could not manage that.

And what contrivances are resorted to by pharmacies in order to fulfill their assigned plans! Just imagine this situation. Last year we had an intensive epidemic of the flu. The pharmacies sold more drugs, many of which were quite

expensive. This year, however, there was no epidemic, fortunately. Then a plan comes down based on last year's sales and is even higher. What are we supposed to sell? We sell goods that in principle should be sold at cosmetic and perfume shops. Come what may, but we are pharmacists and paramedical specialists. And instead of cologne we could also be selling medicine that is in demand! But such medicines are in short supply from one year to the next while the turnover plan continues to be raised. And here is the cross we have to bear -- as we inwardly curse everything in the world, we find ourselves selling our visitors preparations that have long since gone out of use. There have been situations where more preparations than are needed are brought into the city. I recently saw employees of another pharmacy hawking a "combination package" on the street. Parenteral vitamin ampules were being offered along with a good anti-flu preparation. The passers-by were being glibly told that they are getting a very effective vitamin. But surely the vitamin was certainly not suitable for everyone and should not have been used without rigid instructions... And what joy there is in the pharmacy when mustard-poultices are delivered! Not only because the poultices are in short supply and have been expected for a long time. But because they can be sold at an "intensive rate" which will at least take some of the load off the need to sell unmarketable and obsolete medicines.

What kind of effect can these medicines be expected to have? What effect can be expected from all of these asphenes and Trasicors? A minimal effect. On the other hand, from one year to the next we are experiencing shortages of the simplest preparations. There is no iodine or belladonna tincture and there is a poor supply of bandage and dressing materials. There is no chlorine preparations for disinfection. We don't at all understand why shipments of glucose have stopped.

I have been talking about drugs and medical items that are of broad general use. We are in the 20th century, however. We need effective antibiotics. "Heart patients" are in need of Nitrong. How can you expect Nitrong, if nitroglycerin and Validol are received in limited quantities!

I can anticipate the following opposing argument: You said yourself that you are not properly filling out your requisitions for medicines. Yes, that is so. There is no such thing as a scientific forecasting of morbidity. During the summer and the fall it is difficult to say what the winter will bring in terms of colds and whether there will be a flu outbreak and how severe it will be if there is one. Such forecasts are issued when there are epidemics in full progress in neighboring oblasts. Therefore, it is not easy to guess at the beginning of the year how great will the need be for Rimantadine, interferon, and antibiotics. We are still in great need of a flexible and mobile industry that is capable of rapidly changing over to new product lines, and, when necessary, efficiently "turn out" batches of needed medicines.

But apparently we do not have such an industry. Because the "allocation" of medicines in the amounts released are not received by pharmacies at the beginning of the year, but rather in April. And everywhere there is the important notation in these "ledgers" that most of the drugs can be received at the end of the year. But after all, before people get sick they don't first go to a pharmacy to find out if the medicine they need is available! And

we go to neighboring oblasts, seeking out crumbs from the reserves of our colleagues. We are thereby trying to close the gap created by the uncoordinated operation of the plants. The results are poor.

And something else about our requisitions. We certainly do not always get what we ordered. For example, we have a clear idea of what the need is for preparations used to treat cardiovascular diseases. We also ask for more pediatric medicines since our city has a high birth rate. The answer we get is that you are receiving enough. Many of our requisitions are only one-tenth filled.

No, we are not about to throw up our hands. We are trying to improve the pharmaceutical trade. We are making a record of medicinals in short supply (it sounds absurd -- but what is one to do?!). We deliver medicine to homes, i.e., when there is something to deliver. But frequently we are simply not in a position to answer a customer's question as to when a certain medicine can be purchased.

And now, as they say, we shall take a look at the holy of holies -- drug production and the warehouse situation. In spite of all of our entreaties and protests, much of the drugs delivered to us comes in large packages. The pharmacy must then unwrap the drugs without affecting their purity. We have a two-story building. The production premises are arranged on the first floor, and our storage facilities are on the second floor. A large-sized item like a bale of cotton or gauze or barrels of gypsum and similar things will not fit into the elevator. But a pharmacy, a "commercial facility," with a large-scale plan is not supposed to have stevedores. So, here we have 60 kilogram-boxes and heavy bales of cotton that are manually rolled and lifted to the second floor by our women pharmacists and checkers...And surely there will be no reproach forthcoming if an aged woman tired at the end of the day suddenly doesn't pick up a package properly or abruptly lets it fall to the floor...

I will note that our pharmacy is the best in the city with respect to area and working conditions. Many other pharmacies are cramped in former residential premises that have been hurriedly redecorated and, of course, are not suitable for pharmacy operations.

However, let us go through our own premises. Here is where the packager works. He is weighing powders on a primitive medieval type scale. He should be preparing thousands of powder packages a day, but he hardly manages to finish 200. His work is monotonous and not very efficient. And this is because we do not have automatic dispensers. What do you mean no calibrating equipment in a pharmacy! After all, there were domestically made dispensers before -- where did they go?

The washing machine we have is the only one in the city. And that is already obsolete. We don't have enough drying chambers and distillers, the equipment used for making distilled water. That water is indispensable because it is used to clean the pharmacy glassware. A few years ago it was with difficulty that we obtained a still to distill water. We were the only pharmacy in the city to have one. The still frequently goes out of order because the local

water is very hard. And we read science articles about equipment that purifies water through the use of resins in the same way that we read, let us say, about an expedition to alpha Centauri...

We are experiencing great difficulties with obsolete standard documents and instructions that practically go back to our grandfathers' times. Here is an example. In order to make thousands of vials of a simple medicine we are supposed to use materials costing three rubles and 40 kopecks. Since the time of that document's approval, even the threads used to tie the paper cap at the top of the vial has become twice as expensive. And not just the thread. How does one solve that problem? And take this example: Compile a records document at the end of the month and... wait with trepidation for the first inspector. There are so many of these trifling regulations, that one cannot enumerate all of them. If we are expected to increase our commodity turnover and earnings but we are not entitled to increase our staff, who is going to make sure we overfulfill our plan?

Furthermore. We are a cost-accounting institution and we think we are the best pharmacy of the city. We are making a profit, and it would seem we are entitled to allocate some monies from that profit for mechanization and equipment renewal. After considerable debates at the ispolkom of the oblast soviet we were given permission to use part of the profits for those purposes. But that permission was in vain. There was no standard documentation that provided for that kind of action. If one attempted to proceed without such documentation, there would be the risk of violating the law...

It is time to review these backward obstructive "no's" and "don't's." Moreover, one should find out who established those rules? We would be happy to switch over to a brigade contract. We would like to arrange our operation so that one can pay for work actually done.

But our desire alone is not enough. Massive initiatives are necessary in order for restructuring to begin in the pharmaceutical services. Industry too must be shored up and some order must be instilled into the medicinal supply area. Only then will we really say the operations in a pharmacy are "like in a pharmacy."

6289
CSO: 18400457

USSR MINISTRY OF HEALTH RESPONSE TO PHARMACY PROBLEMS

Moscow IZVESTIYA in Russian 24 Jun 87 p 3

[Unattributed article: "How to Help the Pharmacy"]

[Text] The USSR Ministry of Health has reviewed the article "And How Is It in the Pharmacy?" (IZVESTIYA No 35) and believes that the article's author has correctly and substantively posed questions about the need to reexamine the system for planning the operations of pharmaceutical institutions and raising the responsibility of industry for satisfying the health sector's needs for medicinals. He also correctly points out the need to improve the outfitting of pharmacies with automated equipment and the replacement of obsolete standard documentation which has impeded initiative and creative activity on the part of pharmacy personnel.

The USSR Ministry of Health has undertaken a radical restructuring in the provision of medicinals for the public. In that connection, the USSR Central Statistical Administration and USSR Gosplan have been asked to look into the question of removing pharmaceutical institutions from the "Trade and Public Nutrition" category of retail trade enterprises and transferring them to the category of "Health, Physical Culture and Social Security." Under this arrangement the functions of planning the volume of medical commodity sales would be transferred to the USSR Ministry of Health. The results of pharmacy operations for 1987 will be evaluated by the institution of new indicators which reflect the performance of each worker in the institution as a whole (the absence of public complaints and declarations, the absence of errors in the manufacture and dispatch of medicines, and others). Other obsolete standard documents will also be reviewed. Recommendations that have been coordinated with the central committee of the medical worker trade union have been approved for the introduction of the brigade organization and labor incentives at pharmaceutical institutions.

At the present time the health sector's needs for medicinals is being satisfied at a level of from 80 to 85 percent. This has forced pharmacies to record that they have appealed for preparations that are temporarily out of stock.

For tne purpose of rectifying the interrelationships with industry, procedures will be established for setting delivery times and the quantity of medicinals to be shipped that will assure the smooth delivery of medicinal products to

therapeutic-preventive and pharmaceutical institutions. Those procedures will also assure an efficient way of handling questions pertaining to increases or decreases in drug deliveries as may be required by changes in the sanitation-epidemiological situation or methods employed for the treatment of illnesses and the application of medicinals. Simultaneously, the USSR Ministry of Health, in concert with the USSR Gosplan, the USSR Ministry of the Biomedical Industry, and other ministries and departments, will attempt to increase the output of medicinals. With this purpose in mind, proposals have been prepared and transmitted to those organizations that call for an expansion in the production of the most important drugs that are in short supply.

Our home industry is manufacturing about 60 categories of instruments and apparatus in order to provide pharmacies with automated devices. However, the pharmacies' need for such equipment is only being satisfied at a 40 to 50 percent level. The USSR Ministry of Health has prepared assignments for the Ministry of Instrument Making, Automation Equipment, and Control Systems and the Ministry of the Biomedical Industry to manufacture these items in substantially larger quantities.

The All-Union Scientific-Research Institute of Pharmacy has been asked to intensify the design of comprehensive labor mechanization devices for pharmacy personnel and to undertake a study of efficiency proposals in order to work out the practical implementation of such devices on a broad scale.

6289
CSO: 18400960

DRUG SHORTAGES IN UZBEKISTAN

Tashkent PRAVDA VOSTOKA in Russian 26 May 87, p 3

[Article by V. Petrunek, head, Public Health and Social Security Section, USSR KNK [expansion unknown], and O. Lukyanchikov, special correspondant, PRAVDA VOSTOKA]

[Text] Medicinal preparations are often listed among items in short supply. The patients are faced with the problem of securing such drugs and paying whatever the asking price is. Although one can do without shoes or an item of clothing, drug shortages are another problem.

What are the patients to feel when the hospitals themselves are short on drugs? The answer is obvious: the pharmaceutical industry is incapable of meeting the demand. This, however, is only partially true. Patients in the burns department of the Samarkand Oblast Hospital may have felt that way, but they would have been in error. In January they were not treated with fourteen drugs that were available in the hospital pharmacy.

At the Ilyichevsk Central Rayon Hospital in the Syrdarya Oblast half of the patients in the obstetrical and gynecological departments did not receive many of the prescribed drugs. However, the national control personnel found that the head nurse held 107 of the drugs, of which only twenty had been used. Among the preparations stored and unused were such important agents as lidase, sea buck thorn oil, and wild rose oil.

Patients in the therapeutic department of the Altyaryk Central Rayon Hospital in the Fergana Oblast did not receive up to four of the prescribed drugs in nine out of ten cases. Again, most of the agents were found to be 'stored' by the head nurse. This fact was common knowledge among the physicians and nurses.

Similar situations were uncovered at the Pastdargom and Ishtykhan rayon hospitals, and at most of the therapeutic facilities of the Karakalpak ASSR.

What is to account for this state of affairs? Personal Gain? Apparently the answer is in the affirmative in the case of Kh. Kayliyev, a physician at the Khodzheliysk Central Rayon Hospital, who appropriated morphine ampules at the expense of his patients. While the republic is waging a war on drug addition, this physician was enriching himself by functioning as a drug pusher.

What other factors figure in this situation? Negligence? Of course! However, incompetence is also a serious problem. The pharmacy at the Khavast Central Rayon Hospital was supplied with a dozen effective antihypertensive agents, but only magnesium sulfate was routinely prescribed. When the prescribing physician was asked to name some new agents, he responded with reserpine -- a drug that has been in use for some thirty years!

This brings to mind a story by Chekhov in which every disease was treated with sodium bicarbonate.

The national control personnel also discovered cases where nurses fail to carry out doctor's orders, substitute one drug for another, and enter fictitious treatment.

Sometimes a hospital does not have a needed drug. This was the case with the antibiotic ampicillin at the Samarkand Oblast Hospital, at two mining hospitals, and at an obstetrical facility. At the same time the antibiotic was stored at the depot of the pharmaceutical administration.

Drugs are reserved for self-supporting pharmacies to the disadvantage of patients at hospitals and clinics. The pharmaceutical administration fulfills drug turnover by better than 109%, while medical facilities routinely fail to utilize assigned finances for drug purchase. Last year alone some two million rubles were not used for purposes intended.

Even drugs that should only be used in hospitals under medical supervision find their way into the over-the-counter trade.

At the Syrdarya Oblast Pediatric Hospital the little patients survived for months on end without the imported drug tetraolean, while the No 4 Central Rayon Pharmacy had some two thousand flasks in its inventory.

Concomitantly, drugs were shipped to the hospital that were unsuitable for pediatric patients. The hospital returned them to the depot, and the depot sent them back that same year to the hospital.

A special drug reserve program is available for infants and veterans of the Great Patriotic War. In practice, such reserves become the personal property of various managers. The national controllers checked several hundred prescriptions for drugs in acute shortage: almost half of the prescriptions were illegal. In the Syrdarya and Samarkand oblasts attempt at circumvention included a deliberate failure to keep proper records of prescriptions and patient visits. In the Karakalpak region half of the prescriptions were made out to fictitious patients. These facts indicate that drug shortage is a relative concept: there is no shortage for those who receive drugs directly from the managers of the Main Pharmaceutical Administration of the Uzbek SSR Ministry of Health. Thousands of lidase flasks and cerebrolysine ampules have been distributed in this manner in Tashkent, many of them on the basis of bogus prescriptions.

At the same time the Main Pharmaceutical Administration is inundated with letters begging for help. This also involved drugs that are in abundance.

Where are the drugs? They are being kept at depots and by the first of January of this year the surplus had a value in excess of five million rubles. Excess supplies should be sold to oblasts with shortages, but this has been carried out in dubious manner at times.

For example, No 17 Pharmacy in the Navoy Oblast sold ethanol to a poultry farm, while No 182 Pharmacy in the Fergan Oblast sold anesthetic-quality chloroform to the Vodokanal [water channel] administration; this was followed by a sale of 40 kg of glucose, a commodity also in short supply. Various alcoholic decoctions, solutions, and pure ethanol are often sold without prescriptions in Karakalpak ASSR, and Navoy, Fergan, and Khorezm oblasts.

These investigations led to dismissal of 22 medical workers, while 110 were reprimanded, and eight were subjected to civil court proceedings. Sterile drug preparation facilities were closed down at seven pharmacies due to sanitary problems.

The Main Pharmaceutical Administration of the USSR Ministry of Health has assigned to Uzbekistan an additional 650,000 ruble's worth of drugs in short supply, a partial shipment of which is on the way. The All-Union Soyuzmedtekhnika Association has provided additional funds for the Uzbek pharamceutical administration for construction purposes, with negotiations currently underway for rapid completion of the projects.

Large sums have been assiged for the feldsher-obstetrical stations for acquisition of medical supplies: some 100-150 different drugs are involved that are to be distributed on the basis of need among the pharmacies and hospitals in Uzbekistan.

It is obvious that corrective measures are being implemented. Nevertheless, care must be exercised to prevent these measures from deteriorating into a routine, ineffective campaign and assure that they indeed lead to an improvement in drug availability in Uzbekistan.

12172
CSO: 8144/4515

'RADIOPHOBIA' CAUSED BY CHERNOBYL

Kiev PRAVDA UKRAINY in Russian 16 Jul 87 p 4

[Article by A. Sokol (interviewer)]

[Abstract] The article is an interview with Leonid Andreyevich Ilin, vice president of the USSR Academy of Medical Sciences, director of the Institute of Biophysics and chairman of the USSR National Commission on Radiation Protection, regarding the need for education of the public about the true status of health dangers presented by the accident at the Chernobyl Nuclear Power Station. Ilin was asked to explain a term he has coined--"radiophobia"--and its meaning for public perceptions about the dangers of the radioactivity that was released. Ilin contended that irrational fears about the danger for public health are complicating efforts of health authorities in dealing with the consequences of the accident. He noted that residents of Kiev had started taking iodine without perscription when there was no real medical need for it. Ilin claimed that nobody outside of the territory of the station itself received a radiation dose above 50 rems, which he said is the medically acknowledged minimum level necessary for causing malignancies.

FTD/SNAP
CSO: 18400934

MEDICAL ASSISTANCE TO TAJIKISTAN

Moscow SECOND PROGRAM "MAYAK" in Russian 1330 gmt 16 Jul 87

[Tajik news from Dushanbe]

[Text] A large group of medical workers from the Ukraine, Latvia, Lithuania, Estonia and Moscow has been flown to Tajikistan. Its task is to help the Tajik colleagues improve medical services for children.

Child mortality rate has declined considerably in the Central Asian republics and, in particular, in Tajikistan during the years of Soviet power, thanks to improvements in the material and living conditions, enhancement of the population's cultural level and an all-round development of health service.

All the same, this indicator is higher in Tajikistan than the average Union indicator. That is why experienced pediatricians, nursing sisters [MN: instead of the usual meditsinskaya sestra, the expression used here is sestry miloserdiya, implying perhaps that the nurses are from charitable or even religious organizations] and fifth-year students from medical institutes of fraternal republics have arrived in the mountainous region.

Three hundred medical personnel, divided into 52 teams, are currently at work in Tajikistan's most inaccessible regions.

/9716
CSO: 18400936

INDUSTRIAL SPONSORSHIP OF SUBSTANCE ABUSE CONTROL

Moscow KHOZYAYSTVO I PRAVO in Russian No 1, Jan 87 pp 31-35

[Article by S. Ovsyannikov, special correspondent]

[Abstract] In view of the recognition of substance abuse as a serious problem, a substance abuse occupational health service office was established at the No 1 Moscow Light Transportation Plant. The service addresses all aspects of substance abuse at work and at home, with particular emphasis on the problem of alcohol abuse by drivers. As a result of a multifaceted approach encompassing medical, psychological, and social techniques, significant reductions in alcohol-related problems have been realized in the first nine months of 1986. Statistics for alcohol-related accidents, wounds and injuries, and gastro-intestinal and cardiovascular complications have been reduced by 12.5 to 29%. These results are a remarkable testimonial to the effectiveness of such services when staffed by dedicated professionals enjoying full management support.

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CSO: 1840/882

MEDICINE IN LATVIA

Moscow KHIMIYA I ZHIZN in Russian No 4, Apr 87 pp 18-27

[Article by M. Krivich and O. Olgin, special correspondents]

[Abstract] A visit to some of the medical centers in Latvia, such as the No 7 Municipal Hospital ("Gaylezers") in Riga, provides an eye-opening revelation of the Latvian republic's high standards of medical care. The hospital is an example of efficiency and careful planning that meets every medical need and provides the patients with a pleasant environment that speeds recovery. This ranges from simple amenities to computerized data handling, and a staff that is dedicated to its profession and patient welfare. Health care is taken seriously in Latvia, with the government providing full support. This accounts for the fact that the mass screening program encompasses 95% of the population, and that there are 48 physicians and 140 patient beds per 10,000 residents in the republic. A photograph is presented of a hospital on the shore of Lake Petushin.

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UDC 575;577.21;578.2

PATTERNS OF MOLECULAR ORGANIZATION OF COLLAR FILAMENTS OF BACTEROPHAGE T4

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 1, Jul 87 (manuscript received 3 Dec 86) pp 249-252

[Article by L.I. Nikolayeva, V.V. Mesyanzhinov and V.M. Zhdanov, Active Member, USSR Academy of Medical Sciences, Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Methods of modern molecular biology allow the creation of chimeric protein molecules with assigned properties. The problem of designing chimeric molecules containing immunocompetent antigen determinants for human and animal virus proteins is particularly important for the development of new generation vaccines. A convenient model for the creation of such hybrid molecules can be found in a number of fibrillar proteins of the bacteriophage T4. This article determines the subunit composition of the collar filaments, N-terminal amino acid group and amino acid composition, and studies the accessibility of the oligomer complex and monomer for proteolytic enzymes. The collar filaments are found to be formed of two copies of the wac gene product. Formation of the dimer is accompanied by conformation changes of the monomer. The dimer is a highly structured protein complex, close, in amino acid composition, to epidermal water-soluble keratin proteins. The authors, therefore, select the new term fibritin to represent these filaments. The high solubility and lack of notable aggregation of fibritin gives it significant advantages in structural studies. Figures 3; references 14: 1 Russian, 13 Western.

6508/9716
CSO: 18400922

UDC 578.833.1.02(665.2)

KINDIA VIRUS: NOVEL ARBOVIRUS ISOLATED IN GUINEA

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 87 (manuscript received 11 Feb 86) pp 109-112

[Article by I. Buaro, N.N. Lomonosov (deceased), V.I. Votyakov, T.I. Samoylova, N.N. Poleshchuk, L.A. Bolshunova, Ye.V. Serebryakova, A.F. Alekhin and Silyu Bolde [C. Balde], Virology and Microbiology Research Laboratory, Kindia, Guinea; Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk]

[Abstract] In 1983 a novel arbovirus was isolated in the Kindia region of Guinea and accordingly designated Kindia virus. The virus was isolated from ixodid ticks Amblyomma sp. and the sanguivorous mosquitoes Aedimorphus sp. and identified on the basis of serologic and ultramicroscopic data as strains Aed. 5020 and Aed. 5643. The viruses passed through Millipore 100 nm pore filters and were pathogenic for suckling albino mice on intracerebral inoculation. Clinical manifestations included dyskinesia with paresis of hind extremities and death. The incubation period on initial infection was 5-6 days, decreasing to 3 days on passage. The isolated strains were nonpathogenic for 3-4 week old mice or guinea pigs eliciting, however, an immune response. Ultrastructural brain studies revealed cytoplasmic replication and identification of 65 nm virions containing a 35 nm nucleoid and a 12 nm thick envelope. Subsequent studies are to be conducted to determine the scope of animal susceptibility and possible human pathogenicity. Figures 1; references 9: 3 Russian, 6 Western.

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CSO: 1840/946

UDC 616.98:578.828]-092:612.017.1-064]-021.5-085

IMMUNOMODULATORS AND CHEMOTHERAPEUTIC AGENTS IN AIDS

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 87 (manuscript received 15 Jan 86) pp 6-14

[Article by V.M. Zhdanov, I.F. Barinskiy, F.I. Yershov and S.L. Nesterchuk, Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] A review of the therapeutic literature in the case of AIDS [in Russian, SPID] demonstrates that essentially three approaches are utilized in the management of this disease: antivirals, immunomodulators, and antiinfective and antineoplastic agents. The antiinfectives and antineoplastics are used to manage the complications of immunodepression, while the antivirals and immunomodulators are directed at the etiologic agent and its immediate effect, ie.., immunosuppression. Although most of the antivirals (suramin, ribavirin, HPA-23 PFA, etc.) and immunomodulators (TF5, IL-2, TP5,

inosiplex, etc.) have been shown to be ineffective in advanced cases, therapeutic pessimism has to be balanced by some degree of success in prodromal cases. The current consensus is that earlier diagnosis with more refined serologic techniques shall facilitate identification of at-risk individuals and employment of the appropriate therapeutic agents on a preventive basis. References 43: 3 Russian, 40 Western.

12172/9716
CSO: 1840/946

4TH SOVIET-SWISS SYMPOSIUM ON STRUCTURE AND FUNCTION OF BIOLOGICAL MEMBRANES

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 4, No 5, May 87 pp 537-554

[Article by L.I. Barsukov, N.Ye. Broude and Yu.A. Chizmadzhev]

[Abstract] The 4th Soviet-Swiss Symposium entitled "Biological Membranes: Structure and Function" was held in March, 1986 in Lausanne at the Polytechnic Institute. The symposium consisted of 31 verbal presentations and 7 poster communications, and was attended by 10 Soviet scientists. Topics covered at the symposium included molecular structure, structure of membrane proteins, membrane immunochemistry, transport and receptor mechanisms, membrane fusion, and endocytosis. Following the symposium, the Soviet delegation visited a number of Swiss research institutions and gained familiarity with research trends at some pharmaceutical houses (Hoffmann-LaRoche, Ciba-Geigy, Sandoz). Soviet presentations at the symposium included a paper by V.F. Bystrov (Institute of Bioorganic Chemistry imeni M.M. Shemyakin (IBC), Moscow) on "2D NMR Studies on Conformation of Linear Gramicidin A Peptide in Micelles and in Solution", and by N.G. Abdulayeva (IBC) on rhodopsin structure. V.V. Demin, K.N. Dzhandzhugazyan, and N.Ye. Broude of the IBC reported on various structural, functional, and molecular studies on Na^+,K^+-ATPase. S.A. Andronati (Physicochemical Institute imeni A.V. Bogatskiy, Odessa) covered structural and functional features of benzodiazepine receptors, while L.I. Barsukov (IBC) reported on phospholipid flip-flop in proteoliposomes. R.V. Petrov (Institute of Immunology, Moscow) dealt with synthetic antigens and vaccines, Yu.A. Chizmadzhev (Institute of Electrochemistry imeni A.N. Frumkin, Moscow) elucidated membrane fusion mechanisms, and R.K. Salyayev (Siberian Institute of Plant Physiology and Biochemistry, Siberian Department, USSR Academy of Sciences, Irkutsk) reported on the use of patch clamp and membrane hybridization methods in evaluating ion permeability of plant membranes.

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CSO: 1840/950

UDC 591.174.3+598.2

TAKE-OFF CHARACTERISTICS OF FLYING ANIMALS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 293, No 5, Apr 87 (manuscript received 1 Oct 86) pp 1256-1258

[Article by A.A. Borin]

[Abstract] A mathematical analysis is presented for the take-off characteristics of a number of avian and insect species. The analysis concentrated on point launches, taking into consideration the elastic elements in the wing-body trunk complex, body weight, and a number of aerodynamic characteristics going into the lift parameter. The data resulted in the formulation of an efficiency factor. Graphical presentations demonstrate that the efficiency factor for birds ranged from 0.28 to 0.47, while that for drosophila was calculated at 0.16. The low value for drosophila was attributed to greater aerodynamic losses in liftoff than in the birds. Well designed helicopters, by comparison, were found to have take-off efficiency factors of 0.47 to 0.68. Figures 1; references 10: 7 Russian, 3 Western.

12172/9716
CSO: 1840/863

AVIATION INSTITUTE DEVELOPMENT OF ELECTRONIC GUIDE FOR BLIND

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jul 87 p 4

[Article by S. Derbenev]

[Abstract] A group of young scientists consisting of V. and M. Shevchenko, A. and T. Vorobyev, V. Seleznev, and P. Safronov at the Moscow Aviation Institute, have constructed a novel microdevice which assists the blind in spatial localization. The device consists of a microwave generator and receiver, with the signals transformed into acoustic stimuli. Trained persons have been found to locate obstacles at a distance of five meters, which is adequate for walking on streets. The device is relatively simple and inexpensive, and may be expected to be suitable for mass production.

12172/9716
CSO: 1840/940

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